QUARTER
TONES

A text with musical examples, exercises and etudes

by Don Ellis

This book is dedicated to

HAROLD BRANCH

who provided the original suggestion for doing such a work and gave the stimulus necessary for bringing it into being.

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QUARTER TONES

INTRODUCTION

Ever since man's earliest days music has played an important part in his life, and just as man has continually worked to expand his horizons in other fields, so has he struggled to increase the means and expressive power of his music.

Today, most of the music one hears in our (Western) culture, is based on the equal tempered scale (i.e., twelve equally spaced notes to an octave). However, since jazz and black music burst on the public consciousness around the turn of this century, the dominance of the equal tempered system has been seriously challenged.

The musics of jazz, blues and rock and roll, with their use of "blue" notes, bent tones, melismas and glissandi introduce pitches not found in equal temperament and anyone familiar with these forms of music knows the tremendous power and excitement these notes"in the cracks of the piano" can generate.

There is a whole new exciting world to be discovered (and rediscovered) in the area of intervals and intonation. The use of quarter tones is a step in this direction. For the future there is much experimentation, research, and just plain making of music to be done.

It is my hope that this book will be of help to persons who are interested in exploring new possibilities.

CHAPTER 1

THE BACKGROUND-EQUAL TEMPERAMENT

First of all, to put things into a historical perspective, remember that our system of twelve equal tempered notes to the octave is a relatively recent development in the history of music, the first equal tempered organ being tuned in Hamburg, Germany in 1688. Before this the music of the world had many different systems of tuning. The earliest of which we have evidence is that of Ling Lum, a court musician under Emperor Huang-ti, living in the 20th Century B. C. in China, who worked out a mathematical formula for the pentatonic scale.

Marin Mersene (1588-1648), the French monk, mathematician and physicist, was the first Westerner to give the correct solution for equal temperament.[2] However, it was not until forty years after his death that the first organ was tuned with his formula for equal temperament (at Hamburg in 1688).

[1] See Harry Partch, Genesis of a Music: Monophony, (Madison, Wis., University of Wisconsin Press, 1949) for an excellent history of intonation.

[2] **Ibid.,** p.256.
Joseph Schillinger, in The Schillinger System of Musical Composition, Vol.1, (New York: Carl Fischer, Inc., 1941), p. 102, credits Andreas Werckmeister **with** developing the mathematical expression for equal temperament $(\sqrt[12]{2})$ in Germany in **1691.** The frequencies are logarithmically related.

One big (and perhaps the only) advantage of equal temperament was that it allowed modulation into all twelve keys. This was a tremendous achievement but it meant that we sacrificed pure (in tune) ratios of pitch to having every interval (slightly) out of tune. For a culture such as ours, which was becoming more and more harmonically dominated and less and less melodically oriented, this was a distinct advantage. When you have only two basic scales (major and minor) out of which to construct melodies, it is almost imperative that you modulate into other keys if for no other reason than to escape boredom. However, even multiplying the two basic scales by each of the 12 chromatic possibilities (which still gives only two basic scales) seems rather colorless when compared to the richness of a musical culture such as India, for example, which has 72 basic Thats ("scales") and 34, 848 possibilities for scales (of which 150 to 200 are in current use) based on only one fixed tonic I

Today, due in no small part to equal temperament, our ears have become dulled to hearing the subtle nuances of pitch that are readily discernible to people in other cultures. We paid a big price for this ability to modulate freely.

My original interest in quarter tones was not just to have 12 more keys (24 to the octave, as opposed to the current 12) to modulate into, or to compound the problems of equal temperament. I wanted to be able to hear other, newer, fresher pitch ratios, some of which happen to come closer to just intonation (i.e., pure ratios) . I've also found I can achieve startlingly new effects with blue notes by means of quarter tones.

CHAPTER 2

THE HISTORY OF QUARTER TONES

Going back in recorded history we find that microtones (any intervals smaller than a semi-tone) have long been a structural part of Asian music. In the West we know that Greek music during the period of Euripides (circa 480-06 B.C.) included quarter tones.-[3] It is also probable that several of the "ornamental" neumes of Gregorian chant involved quarter tones.[4]

One of the most interesting musical mavericks of all time was Nicolo Vicentino (1511-1572) . He used a harpsichord type of instrument called the "arcicembalo", a microtonic instrument (circa 1550) with 31 tones to the octave in six banks of keys. His avowed purpose was to revive ancient Greek genera and his instrument gave all the diatonic, chromatic enharmonic genera of ancient Greek theory.[5]

[3] Willi Apel, Harvard Dictionary of Music. 2d Ed. (Cambridge, Massachusetts: The Belknap Press of Harvard University Press, 1972), Microtones p. 527, **and** Greece II, p. 352.

[x] Ibid., Neumes I, p.571, The "Gradual of Montpellier" illustrates the practical use of quarter tones in the 11th Century.

[5] Ibid., p. 48.
Partch, p. 251.

His enharmonic system divided the whole tone into five parts.[6] It is significant, perhaps, that most of the musicians of his time were violently opposed to his experiments.

Charles Luython (1556-1620) built a simplified instrument ("cymbalum universale") with 18 keys to the octave which allowed modulation to all keys without resorting to the compromise of equal temperament.[7]

Lemme Rossi (1601-1673) gave numbers for string lengths of equal quarter tones, perhaps for the first time.[8] At the end of the Seventeenth Century Christiaan Huygens suggested a 31-part division of the octave, allowing modulation in just intonation.[9] (Adriaan Fokker has advocated the same 31-note scale in this Century.)[10]

[6] Gustave Reese, Music in the Renaissance, (New York: W.W. Norton & Company, Inc., 1959), p. 328.

[7] Harvard Dictionary, 2d Ed., p.49.

[8] J. Murray Barbour, Tuning and Equal Temperament, (East Lansing, Michigan: Michigan State College Press, 1953), pp. 201, 220. Partch, p. 299.

[9] Harvard Dictionary, 2d Ed., p. 527.

[10] Ibid., p. 449.

A Syrian Theorist in the Nineteenth Century, Michael Meshaquah, advocated dividing the octave into 24 equal parts.[11] Joseph Yasser, in his book, The Theory of Evolving Tonality (1932) suggests the division of the octave into **19 equal** parts.

Since its introduction in 1688 equal temperament became the main force in musical intonation in the West and overshadowed all else. But musicians became restless, and in 1895 Julian Carrillo wrote a string quartet using quarter tones, and in the early 1900's Charles Ives[12] began writing in quarter tones. A theory of third tones was developed by Ferruccio Busoni.[13]

[11] Hermann Helmholtz, On the Sensations of Tone, (New York: Dover Publications, Inc., 1954), p. 264. Partch, p. 298.

[12] Charles Ives (edited by Howard Boatwright), Essays Before a Sonata and Other Writings, (New York: W. W. Norton & Company, Inc., 1961), p. 105. Ives has some very provacative things to say about quarter tones and constructing harmonies out of them, suggesting among other things that quarter tone harmonies sound better when there are at least four notes to a chord, rather than three, since 3-tone chords tend to sound more like previously **familiar** chords.

[13] Ferruccio Busoni, Sketch of a New Esthetic of Music, (New York: G. Schirmer Inc., 1911).

I. Vysnegradsky wrote "Dithyramb" in 1926 and "Prelude and Fugue" in 1929 using quarter tones, and in 1930 Hans Barth wrote a "Concerto for Quarter Tone Piano and Strings."

Perhaps the most noted composer of quarter tones, the Czech, Alois Haba, wrote many pieces that used quarter and sixth tones. Harry Partch (1901-) has divided the octave into 43 unequal parts and written many provocative works, some of which are currently available on record.[14] Recently younger composers, such as Krzystof Penderecki, have become interested in the possibilities of quarter tones.

The first patent on a quarter-tone piano was in 1892 by G. A. Behrens-Senegalden.[15] In 1902 Max F. Meyer had a harmonium that played quarter tones and he developed a system of music that stated the case for using ratios as common musical terms (for the purpose of clarity).[16]

[14] *See* p. 19.

[15] Harvard Dictionary, 2d Ed., p. 528.

[16] Max F. Meyer, The Musicians Arithmetic; Drill Problems for an Introduction to the Scientific Study of Musical Composition, (Columbia, Missouri: University of Missouri Press, 1929) .

Indian music for many centuries has had a system of 22 notes (srutis) to the octave. For a fascinating description of this, and many other aspects of Indian music, please refer to the recently re-published book, The Music of Hindostan, by A. H. Fox Strangways.[17]

Ernst Toch, in his book, The Shaping Forces in Music,[18] makes the fascinating suggestion that masters such as Beethovenand Brahms might have used quarter tones in some of their music to good effect! He goes on to give examples of **just how** they might have done this. He also states a case for making quarter tones intelligible, logical and " beautiful."

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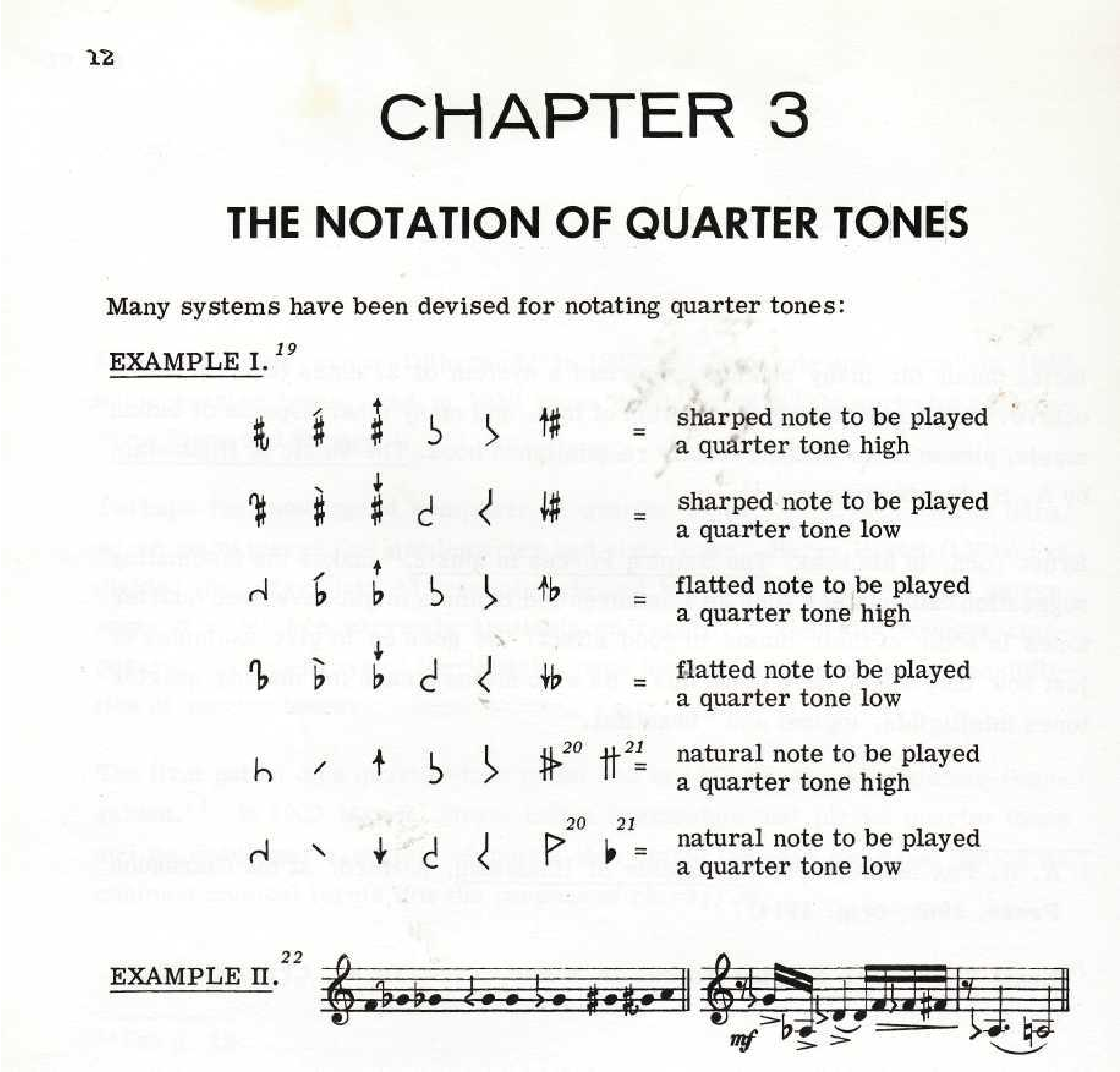
[17] A. H. Fox Strangways, The Music of Hindostan, (Oxford: at the Clarendon **Press,** 1965; orig. 1914) .

[18] Ernst Toch, The Shaping Forces in Music, (New York: Criterion Music **Corp.,** 1948) .



CHAPTER 3

THE NOTATION OF QUARTER TONES

Many systems have been devised for notating quarter tones:

EXAMPLE I.[19]

= sharped note to be played a quarter tone high

= sharped note to be played a quarter tone low

= flatted note to be played a quarter tone high

= flatted note to be played a quarter tone low

[20] [21] = natural note to be played a quarter tone high

[20] [21] = natural note to be played a quarter tone low

EXAMPLE II.[22]

Example II shows the notation of quarter tones and the beginning of Haba's Op. 9.

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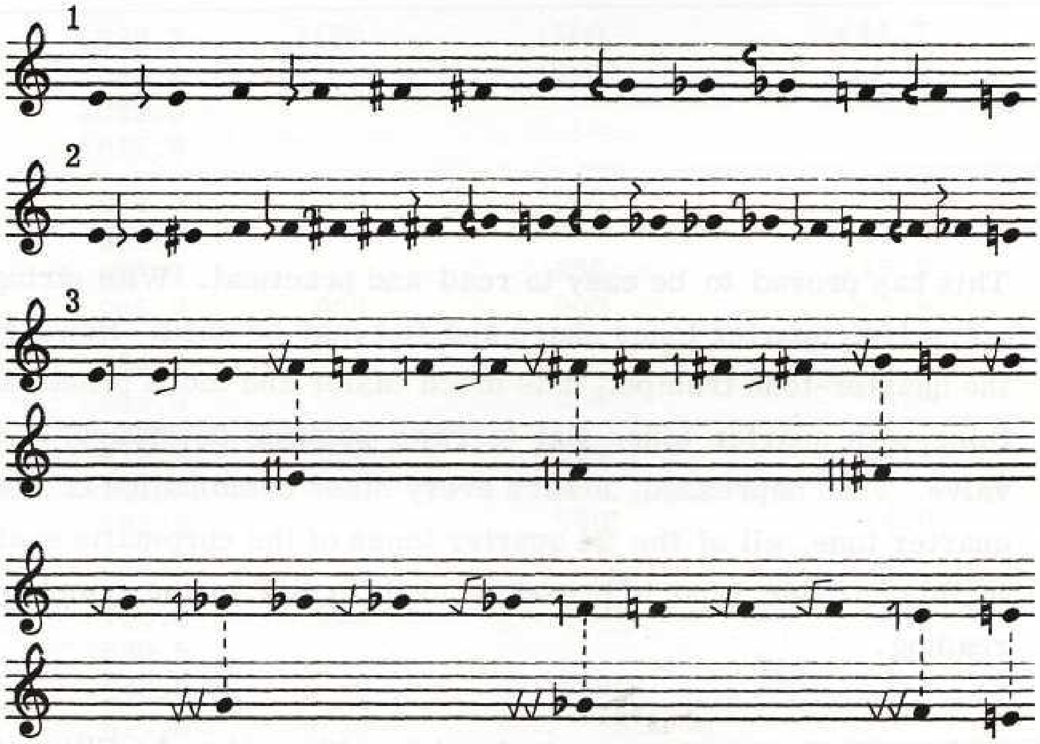
[19] Gardner Read, Music Notation, 2d Ed., (Boston: Allyn and Bacon, Inc., 1969), p. 145.

[20] Musical Quarterly, Contemporary Art Music in Persia, (New York: G. Schirmer, Inc., Vol. LI, No. 4, October 1965), p. 640 (Ali Naqi Vaziri- b. 1886).

[21] Pavel Blatny, The Study for 1/4 Tone Trumpet, Dedicated to Don Ellis, May 1965, Brno-Czechoslovakia.

Willi Apel, Harvard Dictionary of Music, (Cambridge, Massachusetts: Harvard University Press, 1955), p. 619.

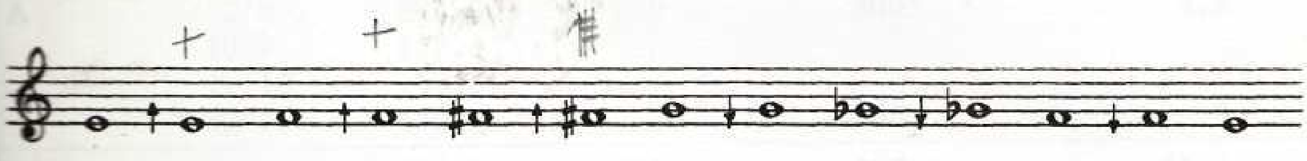
EXAMPLE III.[23]



1. Haba system for quarter tones found in his String Quartet op. 12, no. 2.
2. Haba - for sixth tones, found in his String Quartet op. 81, no. 11.
3. Another fairly common system for quarter tones used by Krystof Penderecki in Anaklasis (1959/60) .

To me the simplest and clearest form of quarter tone notation is the simple use of arrows:

EXAMPLE IV.



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[2] Harvard Dictionary, 2d Ed., p. 527

This has proved to be easy to read and practical. With stringed instruments, notes both quarter tones sharp and flat may be used. However, in the case of the quarter-tone trumpet, it is much easier and more practical to notate every thing with quarter tones flat (arrows pointing downward) . Since the fourth valve, when depressed, lowers every other combination of the first three by a quarter tone, all of the 24 quarter tones of the chromatic scale can be notated in this manner, and it presents no difficulty to the trumpet player in sight reading.

According to a system worked out by Alexander J. Ellis (1814-1890), the famous annotator to Hermann L. F. Helmholtz, each of the equally spaced 12 notes of the chromatic scale are equal to 100 cents, and there are 1200 cents to an octave. Therefore, a quarter tone would be equal to 50 cents. (Mathematically, cents are a logarithmic measurement.) The following chart shows the relationship between quarter tones, equal temperament and just intonation.[24]

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[24] See also Partch, p. 303.

SCALE TONE	RATIOS	CENTS	12 TONE EQUAL	24 TONE EQUAL	CENTS OUT OF TUNE IN COMPARISON TO JUST INTONATION
G	2/1	1200	1200	1200*	0
	160/81	1178.5			
	64/33	1146.8		1150*	+3.2
	40/21	1115.5			
F♯	15/8	1088.3	1100	1100	+11.7
	11/6	1049.4		1050*	+.6
	20/11	1035.0			
	9/5	1017.6			
F	16/9	996.1	1000	1000*	+3.9
	7/4	968.8			-18.8
	12/7	933.1		950	+16.9
E	27/16	905.9	900	900	-5.9
	5/3	884.4			
	18/11	852.6		850*	-2.6
E♭	8/5	813.7	800	800	-13.7
	11/7	782.5			
	14/9	764.9		750	-14.9
	32/21	729.2			
D	3/2	702.0	700	700*	-2.0
	40/27	680.5			
	16/11	648.7		650*	+1.3
	10/7	617.5			
C♯	7/5	582.5	600	600	+17.5
	11/8	551.3		550*	-1.3
	27/20	519.5			
C	4/3	498.0	500	500*	+2.0
	21/16	470.8			
	9/7	435.1		450	+14.9
	14/11	417.5			
B	5/4	386.3	400	400	+13.7
	11/9	347.4		350*	+2.6
B♭	6/5	315.6			
	31/27	294.1	300	300	+5.9
	7/6	266.9		250	-16.9
	8/7	231.2			
A	9/8	203.9	200	200*	-3.9
	10/9	182.4			
	11/10	165.0			
	12/11	150.6		150*	-.6
A♭	16/15	111.7	100	100	-11.7
	21/20	84.5			
	33/32	53.2		50	
	81/80	21.5			
G	1/1		0	0	0

- = FLAT

+ = SHARP

*** = most** in tune

Partch. page 303, for further scales.

Note that the quarter-tone scale comes close to pure intervals in the notes indicated above by asterisks on the chart. The other notes are "out of tune" in the exact relationship to the extent that they vary from the pure (just) ratios. (For many interesting scales approaching just intonation which can be derived from this chart see Pages 33-37.)

To point out the value of quarter tones in today's context let me quote from Harry Partch, an advocate of just intonation, and one who is certainly no friend of quarter tones.

> "As a temporary expedient, as an immediately feasible method of creating new musical resources, 'quartertones' are valuable. That they are comparatively easy to obtain is evidenced by the many composers and performers who have used them: Alois Haba, with three piano manuals, the first and third of which played identical tones, and the second a 'quartertone' higher than the other; and Mildred Couper, with two pianos, the second tuned a 'quartertone' above the first."[25]

[25] Partch, p. 302.

MY PERSONAL INTEREST

My first serious interest in quarter tones dates from January 1965, when I began talking to Perry Pirone, a brass mouthpiece maker and repairman on the east coast, about the possibilities of constructing a trumpet that would be able to execute accurate quarter tones. Perry told me that it would be relatively easy to construct such a trumpet and all that was necessary was some type of valve that would lower the other combinations by a quarter step, and that the tubing for this valve would be exactly half as long as the tubing on the second valve of the trumpet (the half-step valve) . I was so delighted with this simple solution to what I had thought would be a rather complex problem that I called the Frank Holton Company right on the spot and asked them if they would be interested in making such a trumpet for me.

They were interested, but I got no results until March 1965, when in one of those amazing historical coincidences I received a communication from Eric Vogel, the German jazz critic, telling me of Pavel Blatny, the noted Czechoslovakian jazz and symphonic composer, and his experiments with a quarter-tone trumpet.

Evidently there was a trumpet player on the other side of the world (in Czechoi-jvakia) who had developed a quarter-tone trumpet, and Mr. Blatny had written a piece for it. I was sent a tape of this piece and was very impressed. I —imediately called the Holton Company back and told them that somebody had already developed a quarter-tone trumpet behind the Iron Curtain. It was only a short time from that moment until I was presented with my first quarter-tone in September 1965!

I have never seen the trumpet used by the Czech musician, so I don't know how it is constructed, but my quarter-tone trumpet has a fourth valve, which is played by the little finger, and it lowers any combination of the first three by a quarter step. I found the quarter tones on the trumpet very easy to play, and to my delight, I found that the trumpet played better than any other instrument I had ever owned. I was apprehensive that adding the fourth valve might destroy the balance of the trumpet, but was pleased to see that it seemed to open up the regular horn and make it play even better. I immediately began playing this trumpet on all my jobs, including the commercial jobs and record dates I was doing in the Los Angeles area at the time.

The first real exposure that the quarter-tone trumpet received was at the Monterey Jazz Festival on September 20, 1966, when my Big Band and I made our debut. This is documented on record and is still available:

Live at Monterey, Pacific Jazz ST-20112

Later on I outfitted my whole trumpet section with quarter-tone trumpets and wrote a piece called "Headquarters." This piece was never recorded. However, we have played it for some radio broadcasts in Europe. We did record several pieces on the New Don Ellis Band Goes Underground album (Columbia CS-9889) which use quarter tones. Even though basically a rock context, you can hear the whole band, and especially the trumpet section, playing quarter tones.

I have been able to find two recordings that are currently available and are excellent examples of quarter tones and microtones:

Concertino Pour Piano En 1/3 De Ton,

Julian Carrilo (Modern Music Series, Gravure Universelle, Philips 839.272 DSY), and

New Music in Quarter-Tones,

which has works by Charles Ives, Calvin Hampton, Donald Lybbert, Teo Macero (Odyssey 32 16 0162) .

Also, Harry Partch has recently recorded some fine works on Columbia:

Delusions of the Fury, M2 30576
The World of Harry Partch, M31227

And, of course, on all my records I make use of the quarter-tone trumpet:

Live at Monterey, Pacific Jazz ST 20112
Live in **[3 ^{2}/3]/4** Pacific Jazz ST 20123
Electric Bath, Columbia CS 9585
Shock Treatment, Columbia CS 9668
Autumn, Columbia CS 9721
Don Ellis at Fillmore, Columbia G30243
Tears of Joy, Columbia G30927
Connection, Columbia KC31766
Soaring, MPS/BASF MB25123
Haiku, MPS/BASF MB25341

I believe we are at a musical crossroads. New developments in melody, rhythm and harmony are needed. But more importantly, our whole system of intonation and tonality must be looked at and re-evaluated, and a fresh approach devised. The surface has barely been scratched. For the first time in history we are at a point where new technological developments make possible the instant testing of theories which in previous generations would have taken years to train musicians to be able to perform. Today, with electronic music, development can occur at **a much** faster rate.

I have invented a new type of electronic keyboard instrument which I believe will answer the needs of composers and musicians to be able to experiment with new concepts of harmony and intonation. In the next few years I hope to find an instrument manufacturer to mass produce this instrument. This will enable composers and musicians to try out new theories of intonation and harmony without having to spend tedious hours building instruments or retuning existing instruments to be able to cope with the new theories.

What has been done with quarter tones so far (including my own work) has been basically decorative rather than organic. Hopefully, instruments that will be developed in the next few years will open the way for new, exciting experiments into the infinite world of tonality and intonation. It is my hope that the new musics that are derived from theories yet to be invented will not just sound different or strange, but be new, fresh, exciting and. . . . .beautiful!

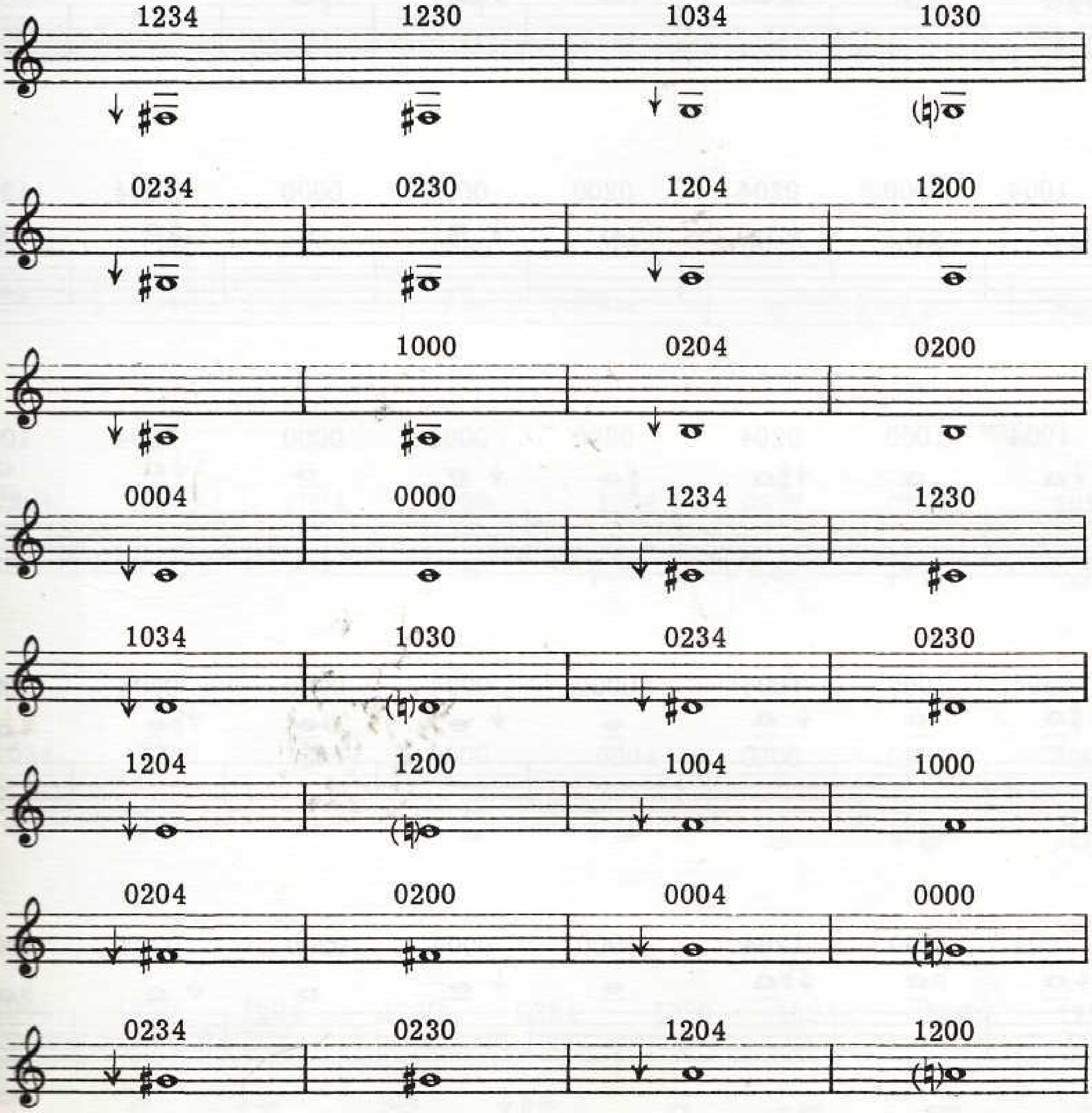
CHAPTER 5

FINGERING CHARTS

THE QUARTER-TONE TRUMPET

On the four valve quarter-tone trumpet the first three valves operate exactly like the normal three valve trumpet. The fourth valve lowers any combination of the first three by a quarter of a tone. Because this is the way the trumpet operates, I have found it expedient to always indicate quarter tones for the trumpet with the arrow downward. This means the trumpeter has only to play whatever note he sees, whether natural, sharped or flatted, and if the arrow points downward in front of it he merely depresses the fourth valve to get the proper tone.

TRUMPET



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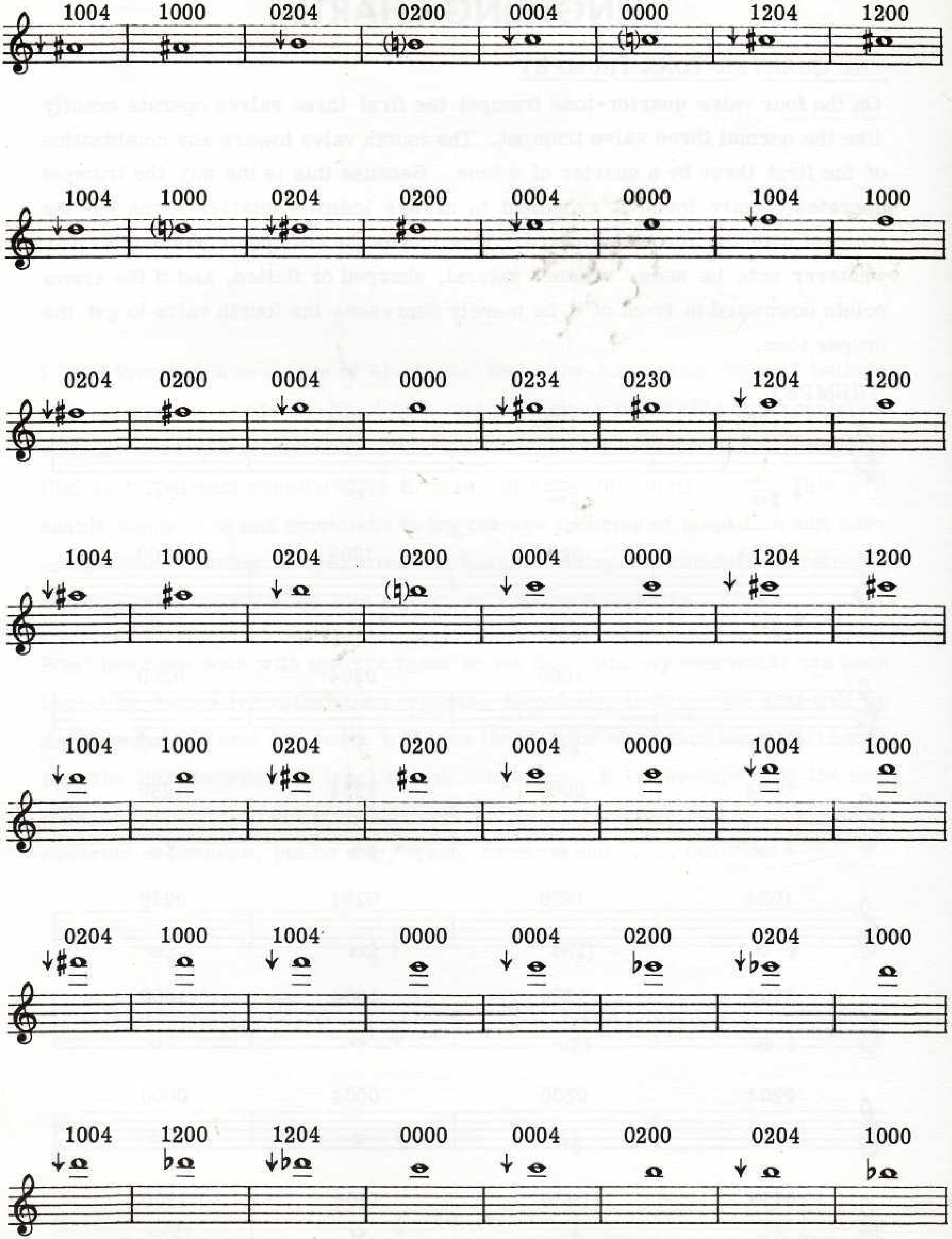
1004 1000 0204 0200 0004 0000 1204 1200
1004 1000 0204 0200 0004 0000 1004 1000
0204 0200 0004 0000 0234 0230 1204 1200
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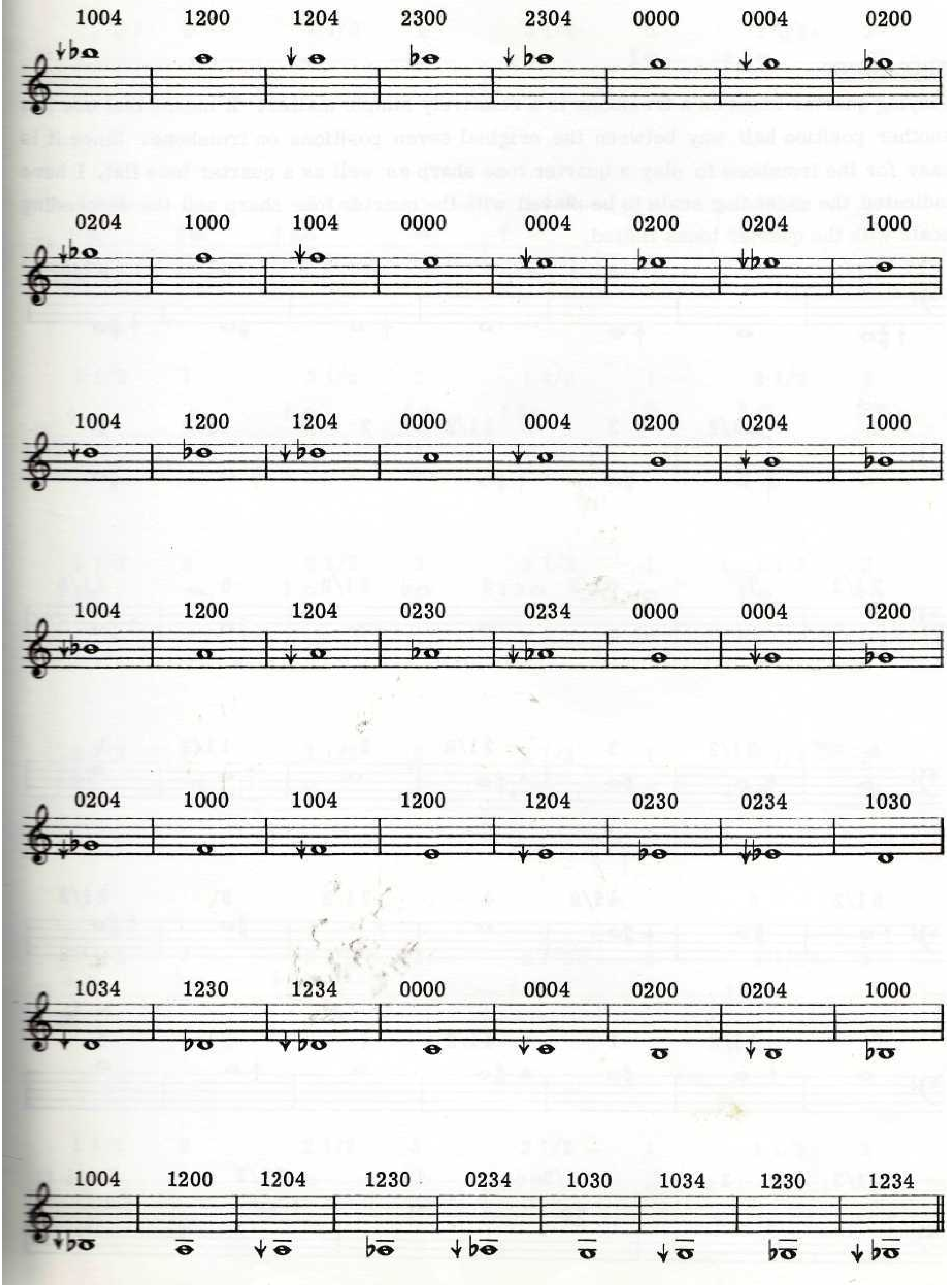
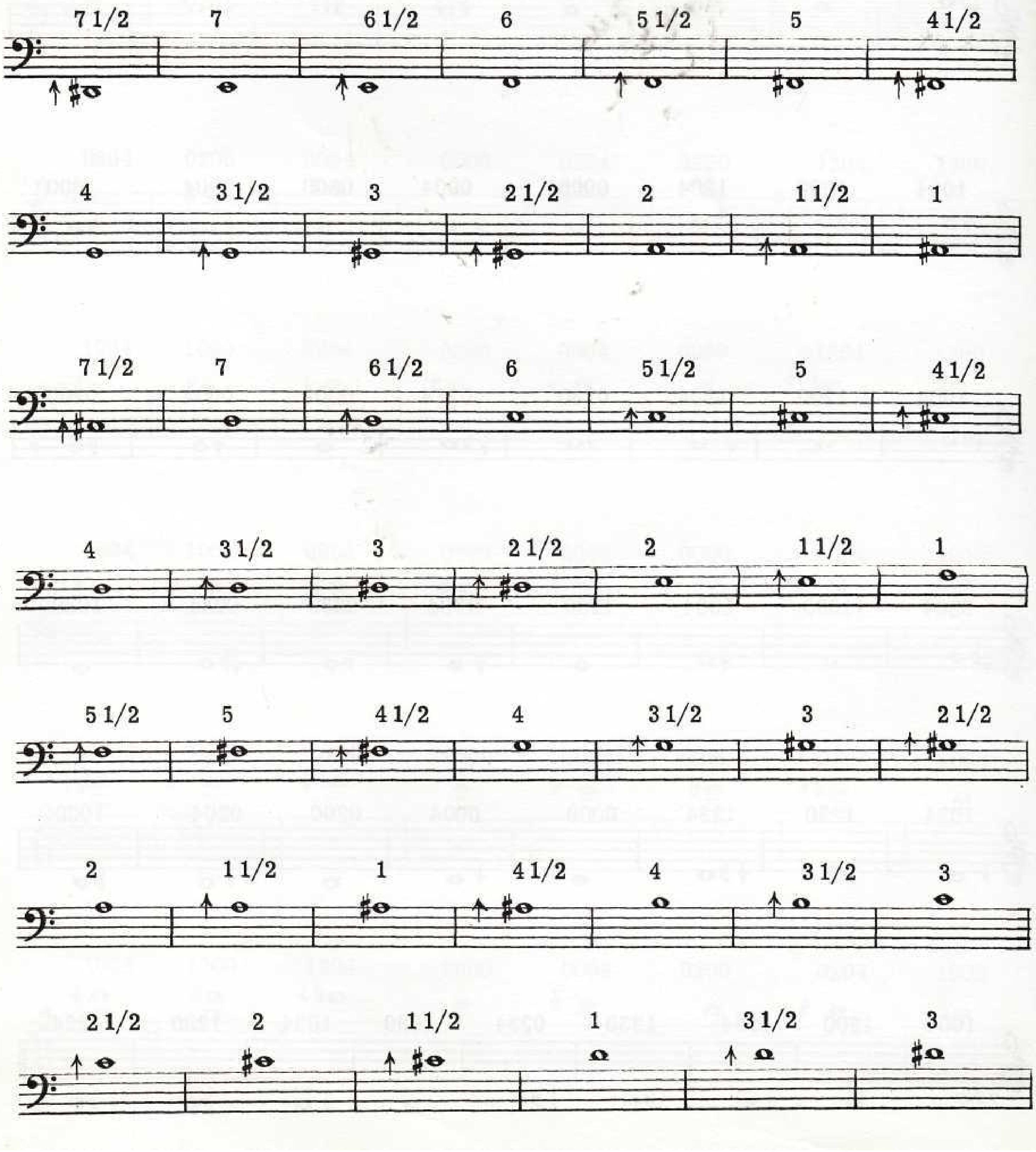
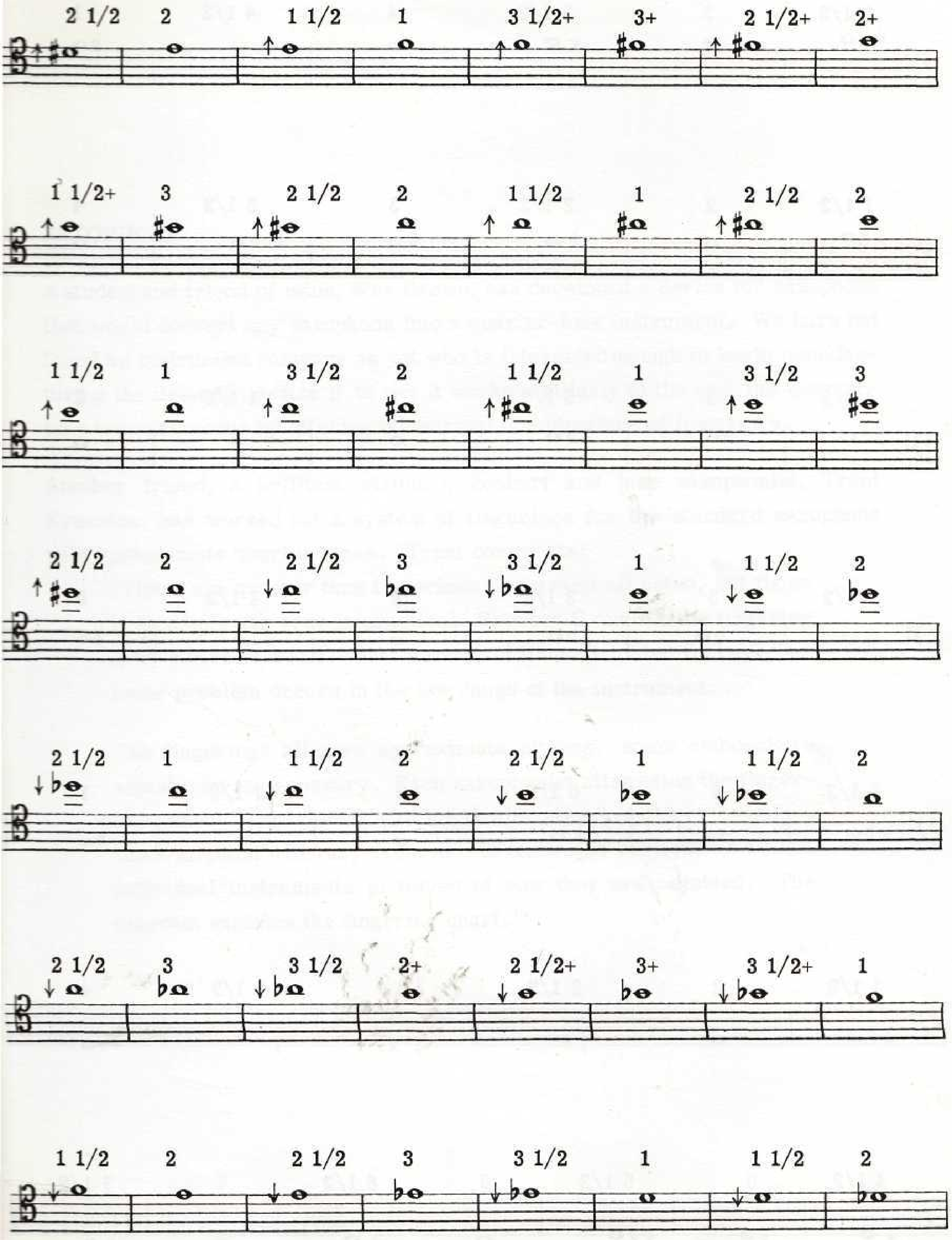


TROMBONE

Playing quarter tones on a trombone is a relatively simple matter. It means that one has another position half way between the original seven positions on trombone. Since it is easy for the trombone to play a quarter tone sharp as well as a quarter tone flat, I have indicated the ascending scale to be played with the quarter tone sharp and the descending scale with the quarter tones flatted.




2 1/2
2
1 1/2
1
3 1/2+
3+
2 1/2+
2+
1 1/2+
3
2 1/2
2
1 1/2
1
2 1/2
2
1 1/2
1
3 1/2
2
1 1/2
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3 1/2
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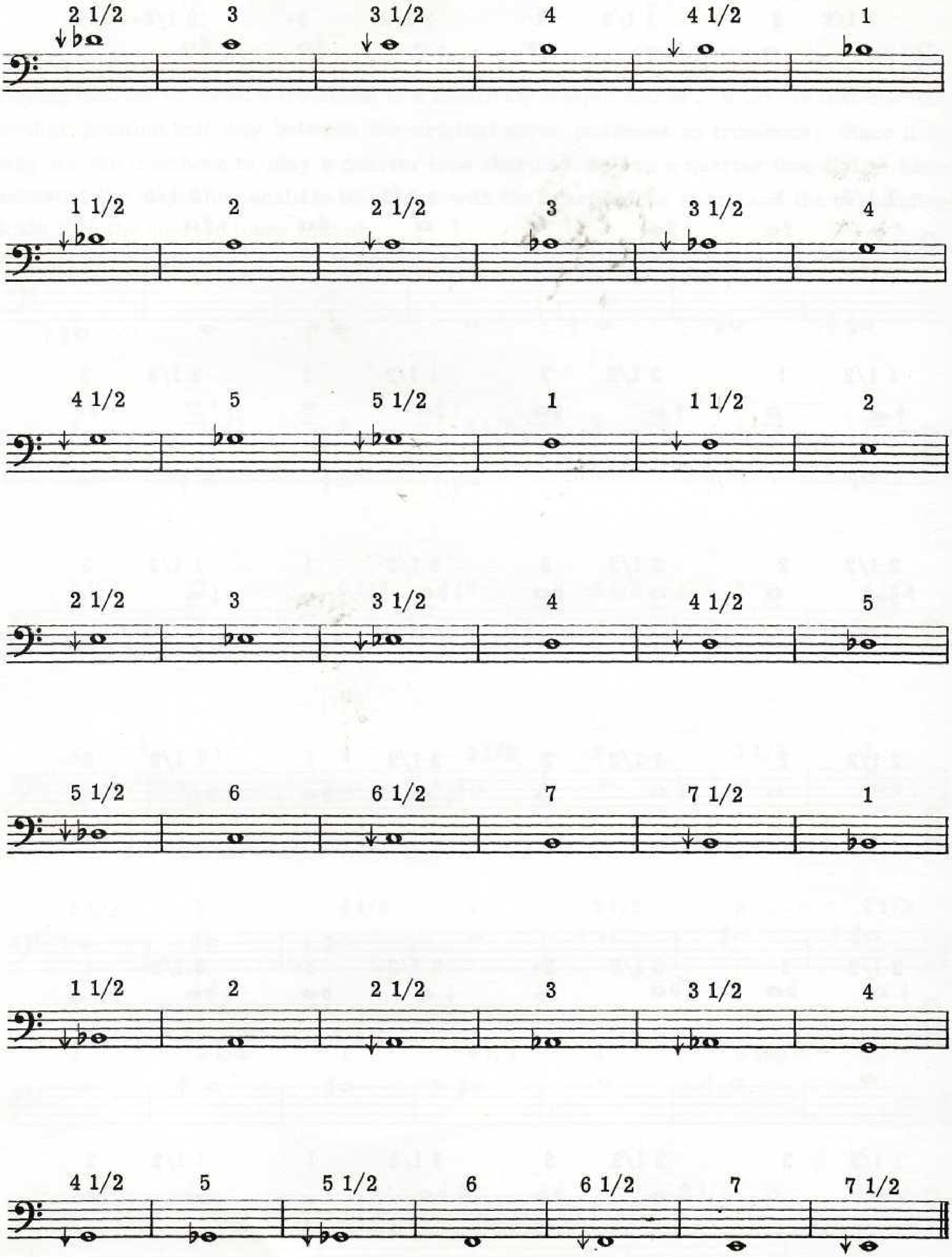
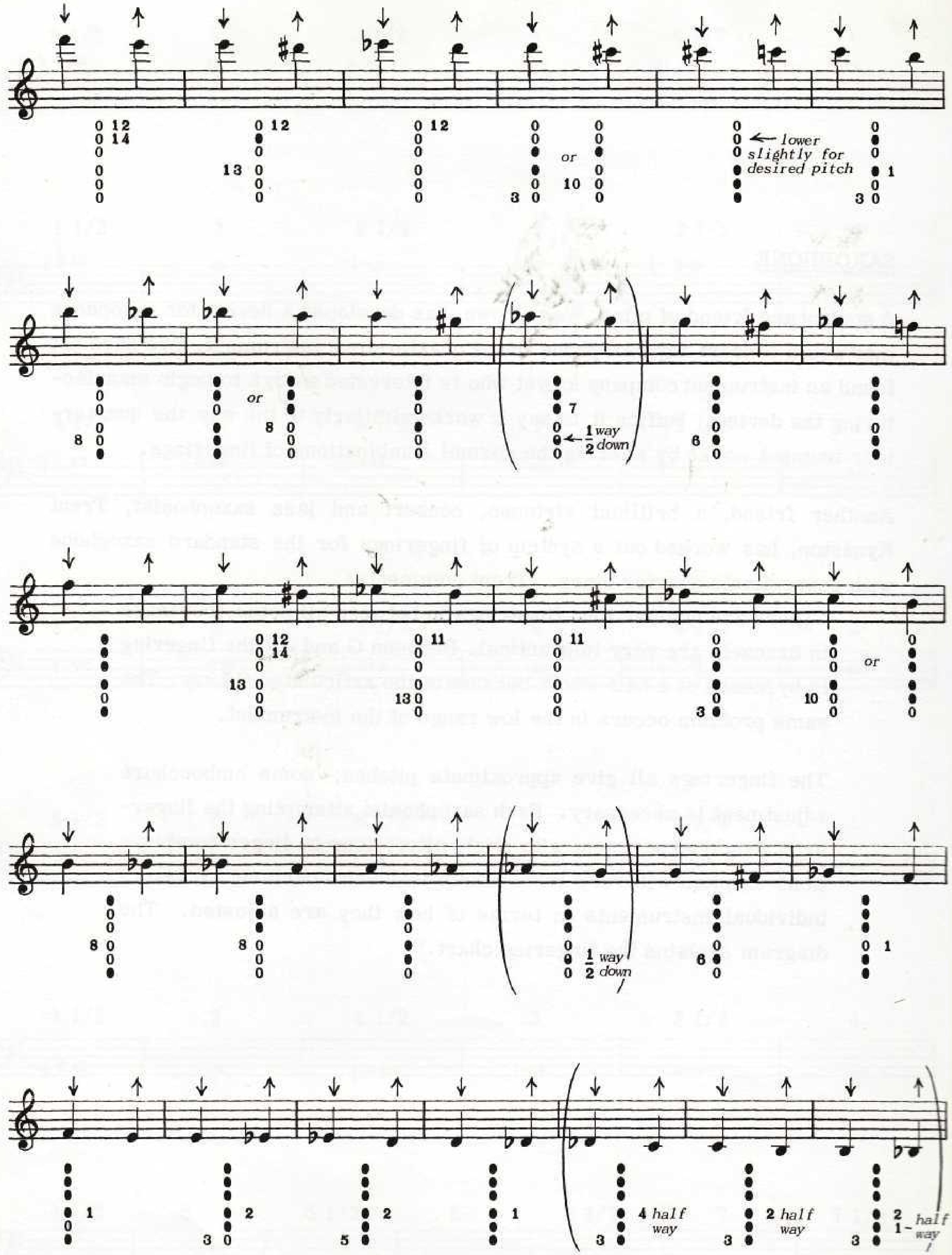

2 1/2 3 3 1/2 4 4 1/2 1
1 1/2 2 2 1/2 3 3 1/2 4
4 1/2 5 5 1/2 1 1 1/2 2
2 1/2 3 3 1/2 4 4 1/2 5
5 1/2 6 6 1/2 7 7 1/2 1
1 1/2 2 2 1/2 3 3 1/2 4
4 1/2 5 5 1/2 6 6 1/2 7 7 1/2

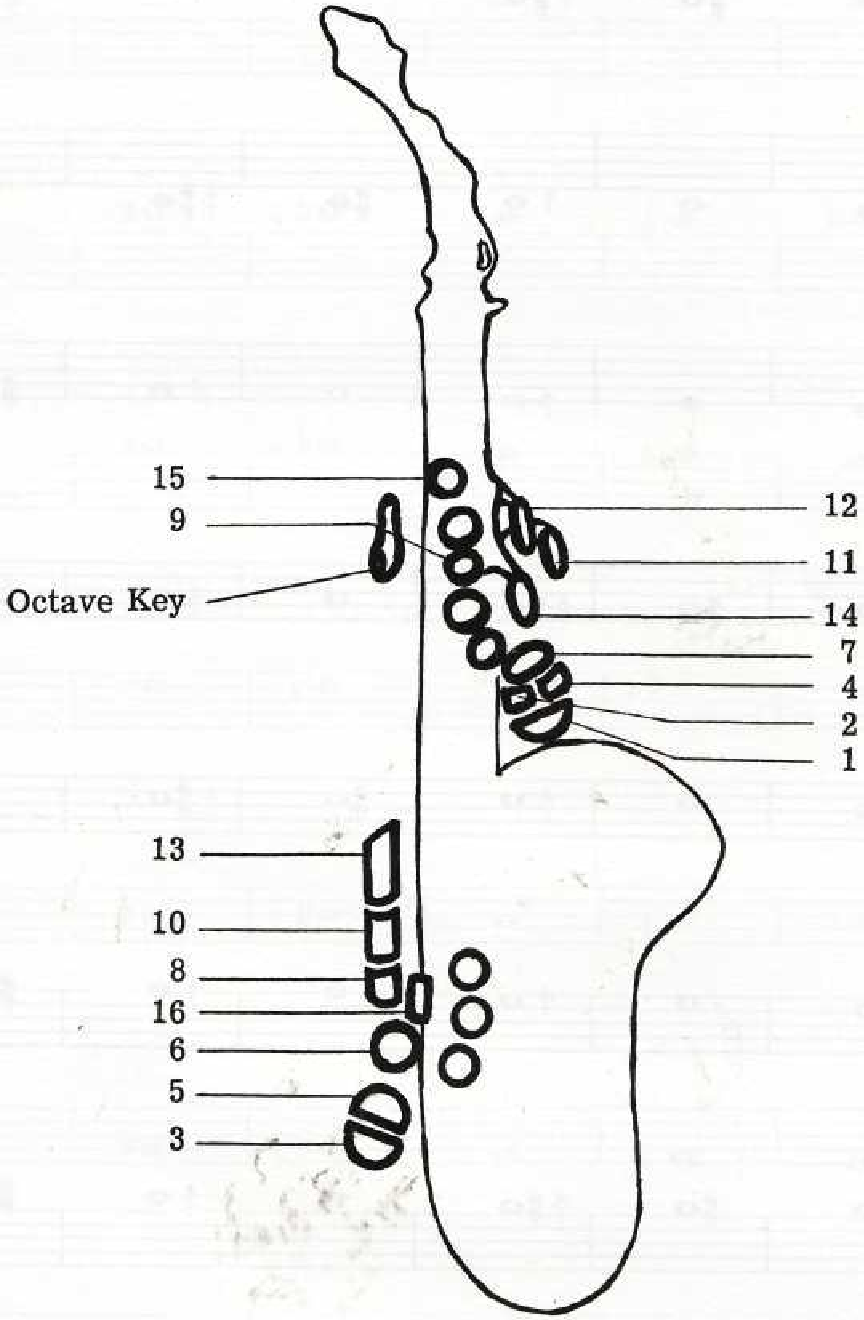
SAXOPHONE

A student and friend of mine, Wes Brown, has developed a device for saxophone that would convert any saxophone into a quarter-tone instrument. We have not found an instrument company as yet who is interested enough to begin manufacturing the device. Suffice it to say it works similarly to the way the quarter-tone trumpet works by altering the normal combinations of fingerings.

Another friend, a brilliant virtuoso, concert and jazz saxophonist, Trent Kynaston, has worked out a system of fingerings for the standard saxophone with approximate quarter tones. Trent comments:

> "There are quarter tone fingerings in between all notes, but those in brackets are very impractical. Between G and Ab the fingering is by means of a half-whole because of the articulated G# key. The same problem occurs in the low range of the instrument.
>
> The fingerings all give approximate pitches; some embouchure adjustment is necessary. Each saxophonist attempting the fingerings should experiment with slight alterations of finger combinations as pitch will vary from alto to tenor and baritone as well as individual instruments in terms of how they are adjusted. The diagram explains the fingering chart."

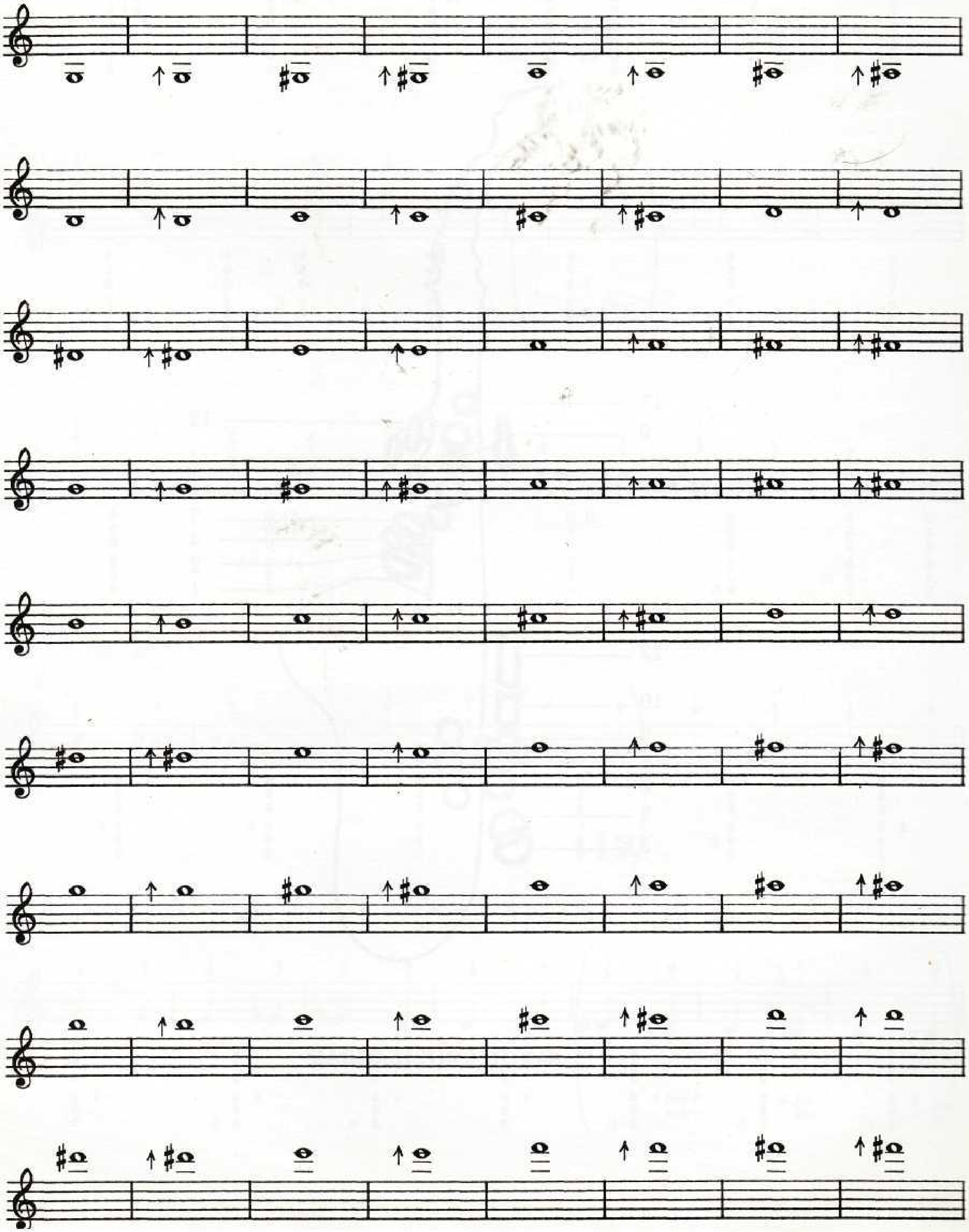

12 14
or
lower slightly for desired pitch
1/2 way down
4 half way
2 half way
1- half way

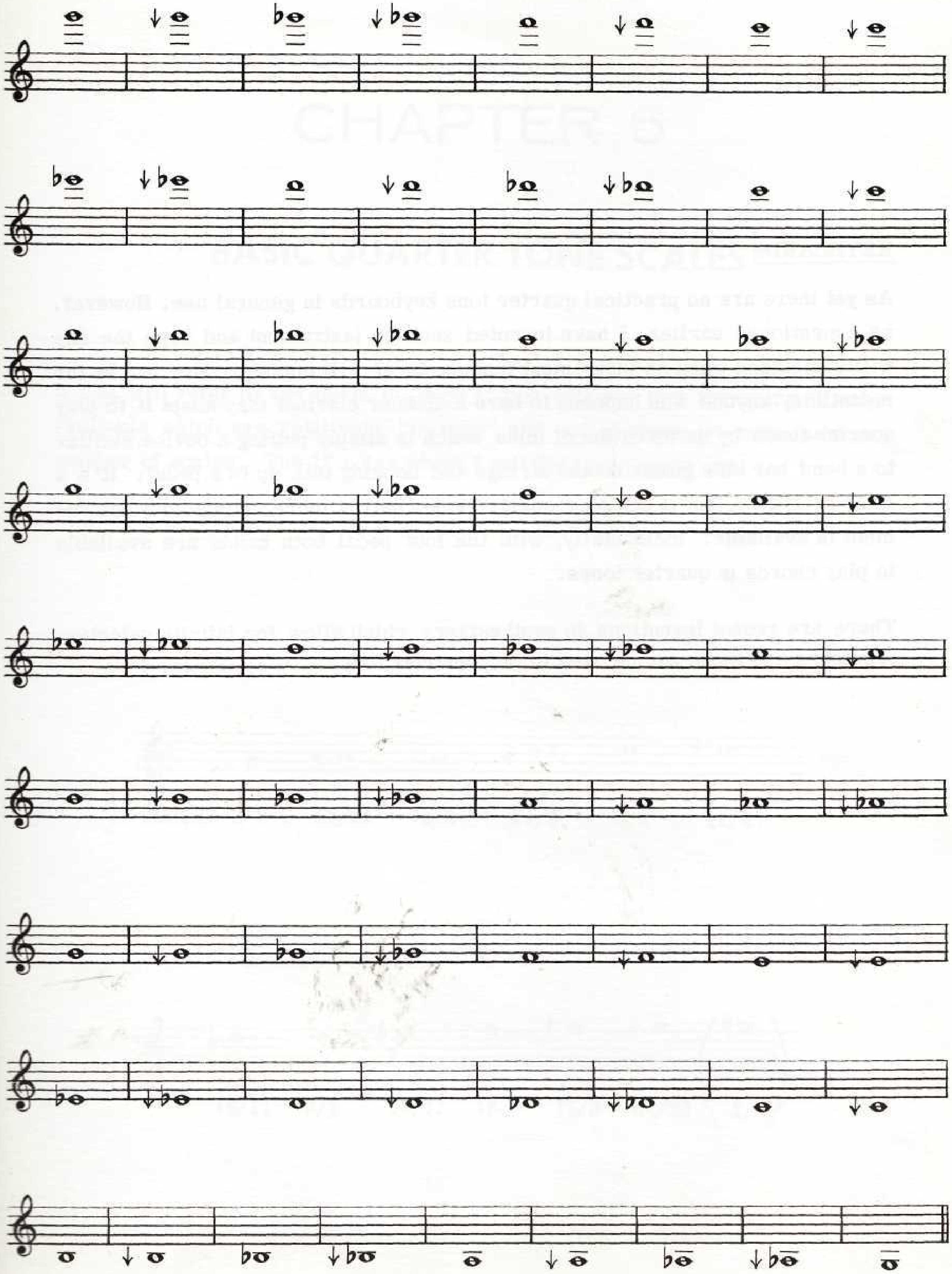


SAXOPHONE DIAGRAM

STRINGS

For an unfretted stringed instrument, playing quarter tones is an easy matter: just flatten or sharpen the note by a half position. I have written out a chart for the treble clef with the quarter tones sharp ascending and the quarter tones flat descending. The bass clef stringed instruments may refer to the trombone chart.





KEYBOARDS

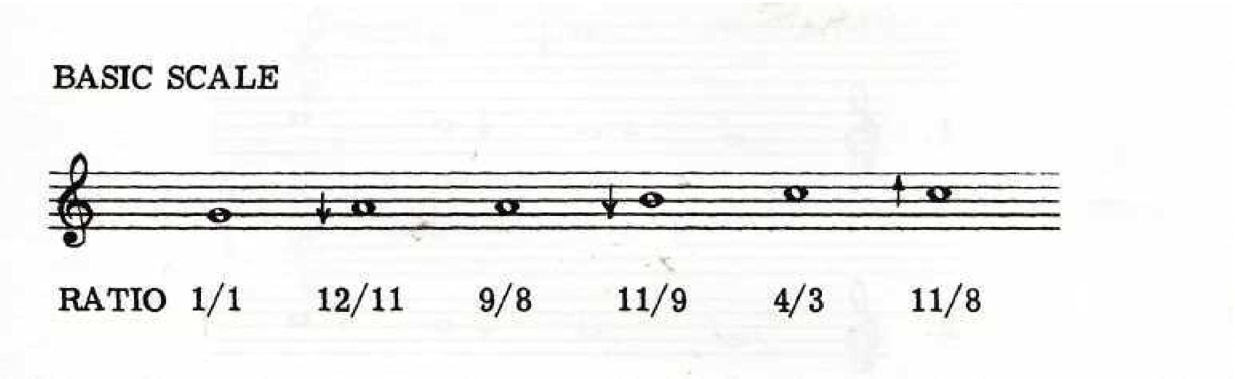
As yet there are no practical quarter tone keyboards in general use. However, as I mentioned earlier, I have invented such an instrument and hope the day will come soon when an instrument manufacturer will mass produce it. In the meantime, anyone who happens to have a Hohner clavinet may adapt it to play quarter tones by an invention of mine which is simply putting a device similar to a bend bar on a guitar on the strings and hooking this up to a pedal. It's a little primitive, but it can play quarter tones until a more satisfactory instrument is available. Incidentally, with the foot pedal both hands are available to play chords in quarter tones.

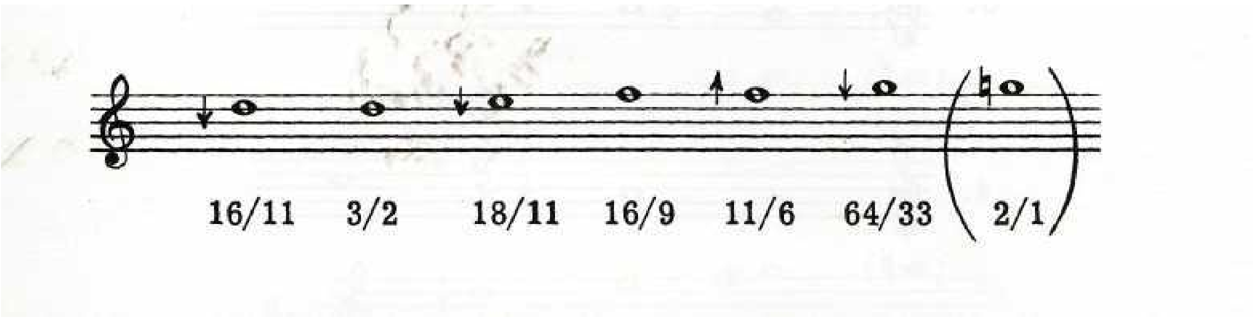
There are recent inventions in synthesizers which allow for infinite selection of pitches and these can be used to play quarter tones.

CHAPTER 6

BASIC QUARTER TONE SCALES

If you will refer to the chart on page 15 you will see that there are 12 notes available which are relatively "in tune" and out of these we may fashion a number of scales. The 12 notes which I call the basic scale are:

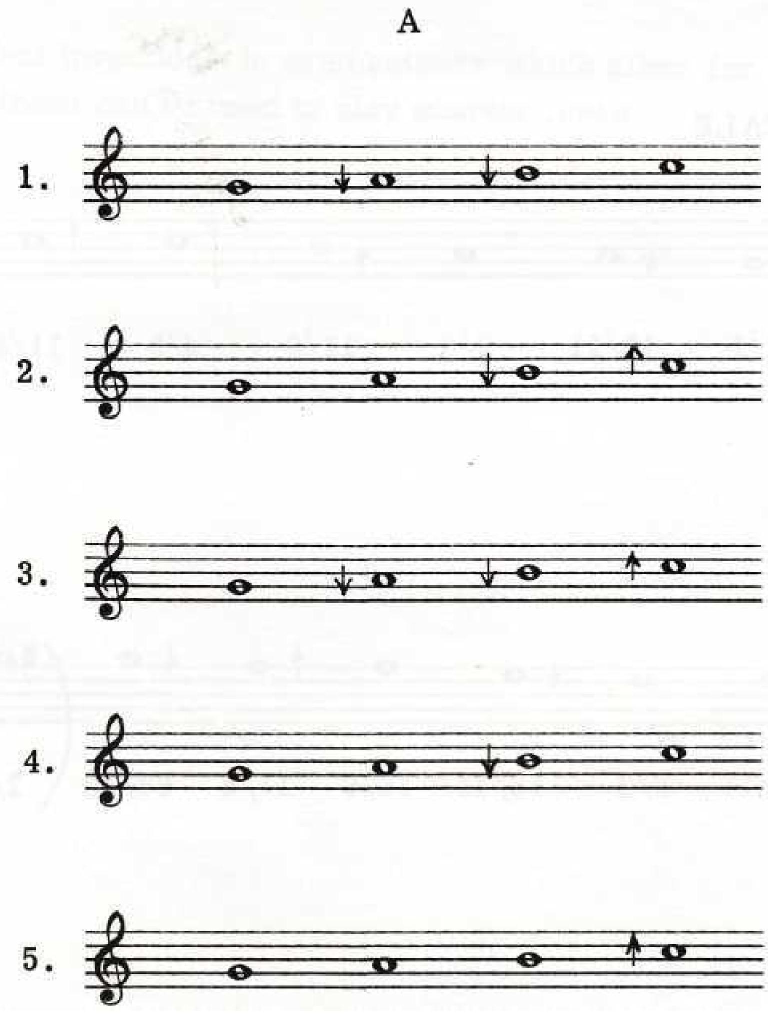




The greatest deviation from pure or just intonation is plus or minus 3.9 cents. For example, A natural is 3.9 cents flat and F natural is 3.9 cents sharp. This gives us a relatively in tune scale with which to operate. (It will be more in tune than most equal tempered scales.) Of course there are an infinitesimal variety of scales that can be made using quarter tones but for the purpose of this book and for my own musical purposes I have decided to limit the scales to the purest ratios.

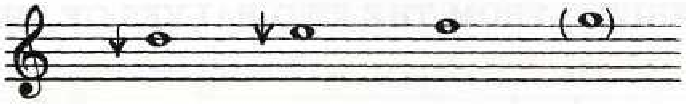
If we divide the scale into two halves, the first half going from the tonic to the fourth, the second half from the fifth (and quarter tone fifth) to the octave, we get the following possibilities:

SEVEN TONE SCALES DERIVED FROM THE BASIC SCALE



B

1.



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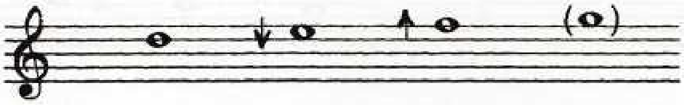

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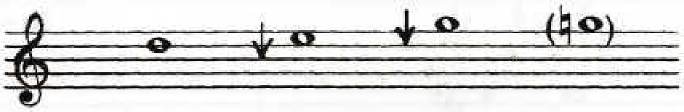

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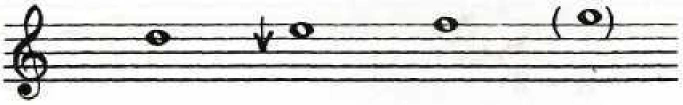

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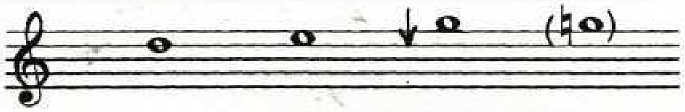

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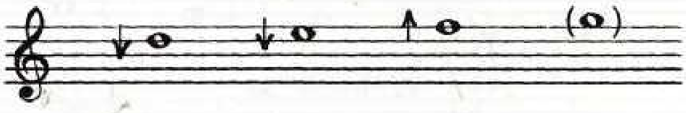

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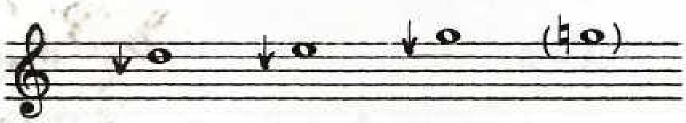

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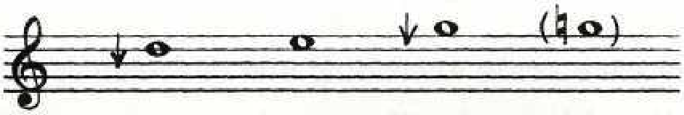
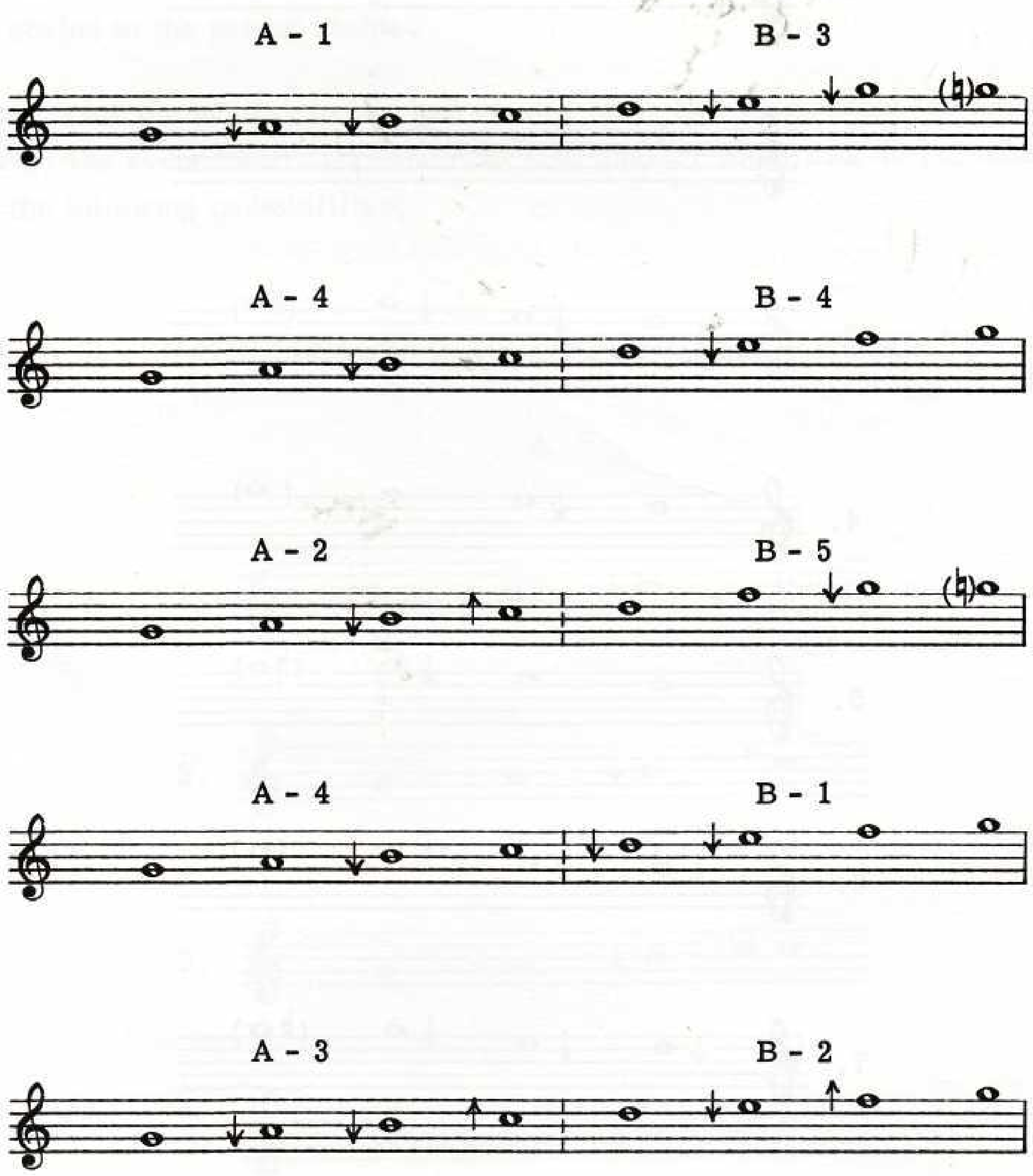


Any line from Group A may be combined with any line from Group B to make a 7-tone scale. The following are examples of some of the possible scales derived from the two halves of the basic scale:

SCALES DERIVED FROM THE TWO HALVES OF THE BASIC SCALE

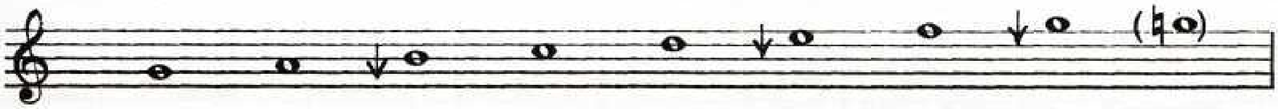


I suggest you play each scale ascending and descending. Then play each interval in turn, test it and listen for the sound.

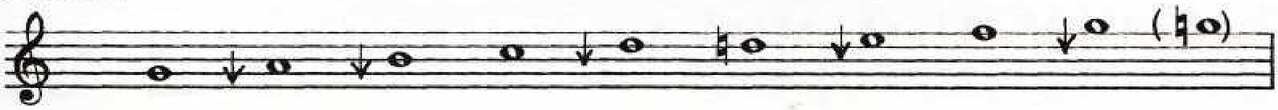
It is possible to derive other combinations of scales from the basic scales using more or less notes than 7. For example:

SCALES USING MORE OR LESS THAN SEVEN NOTES

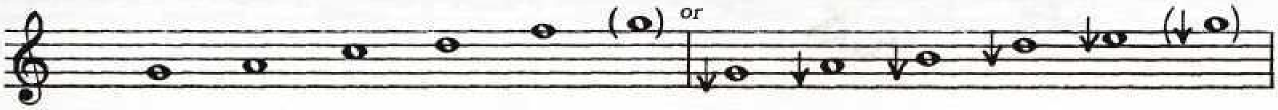
8 TONE



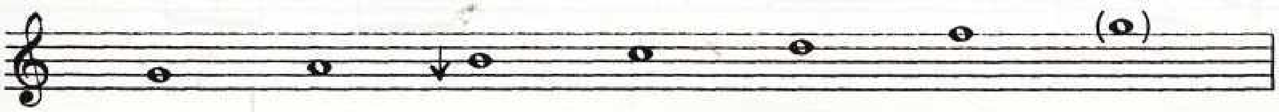
9 TONE



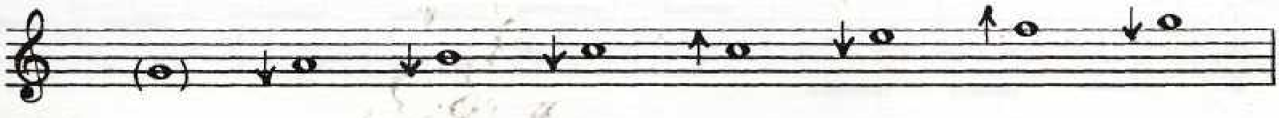
5 TONE



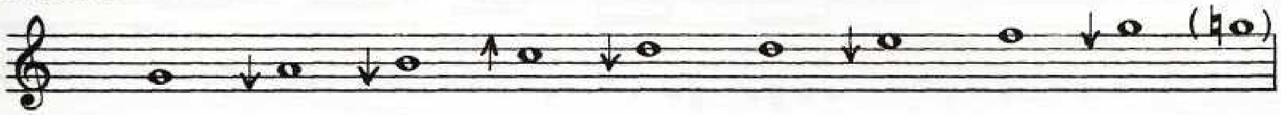
6 TONE



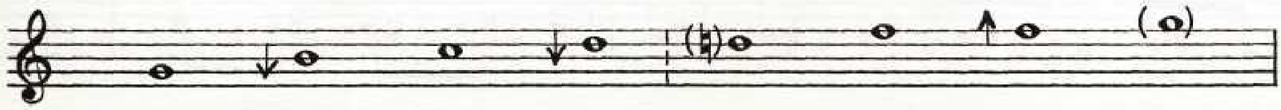
7 or 8 TONE



9 TONE



7 TONE "MAVERICK"



CHAPTER 7

EXERCISES FOR DEXTERITY AND EAR TRAINING

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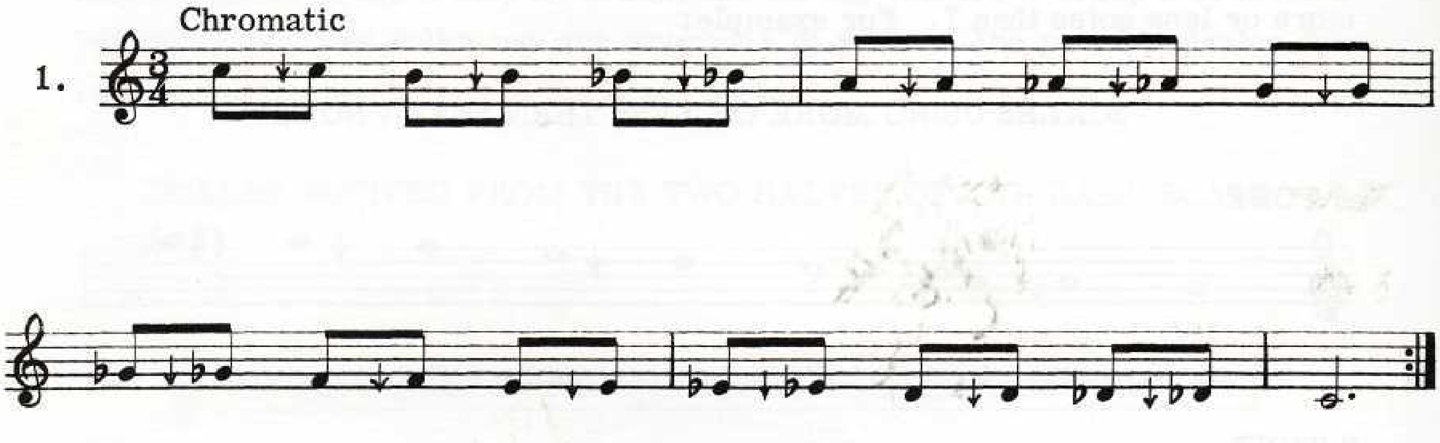

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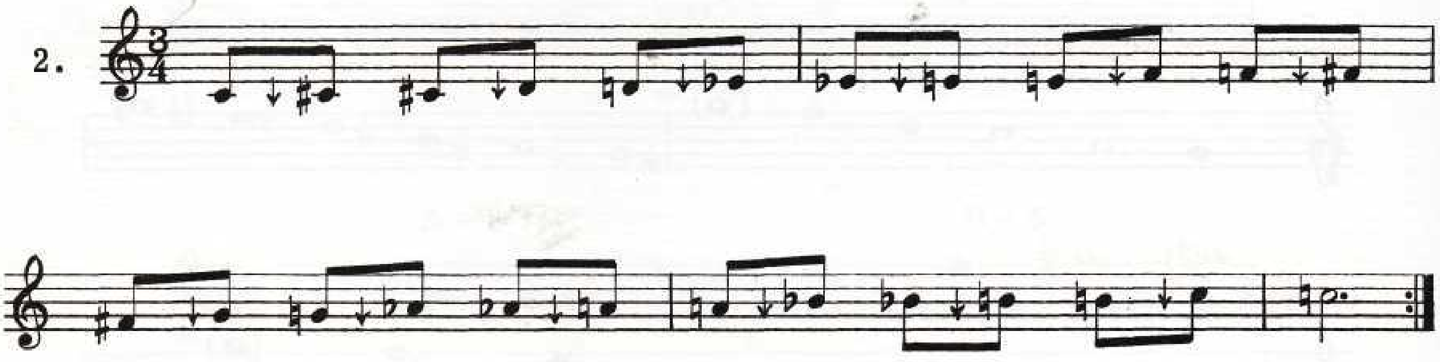

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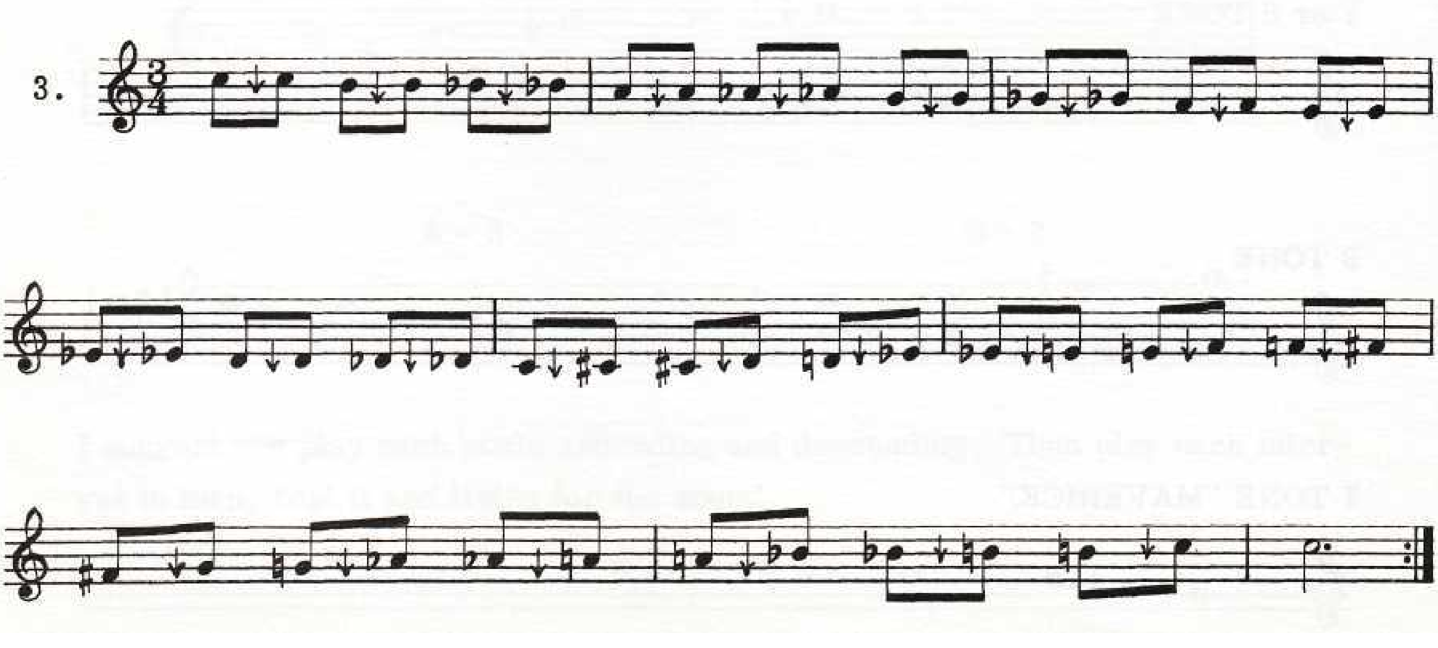

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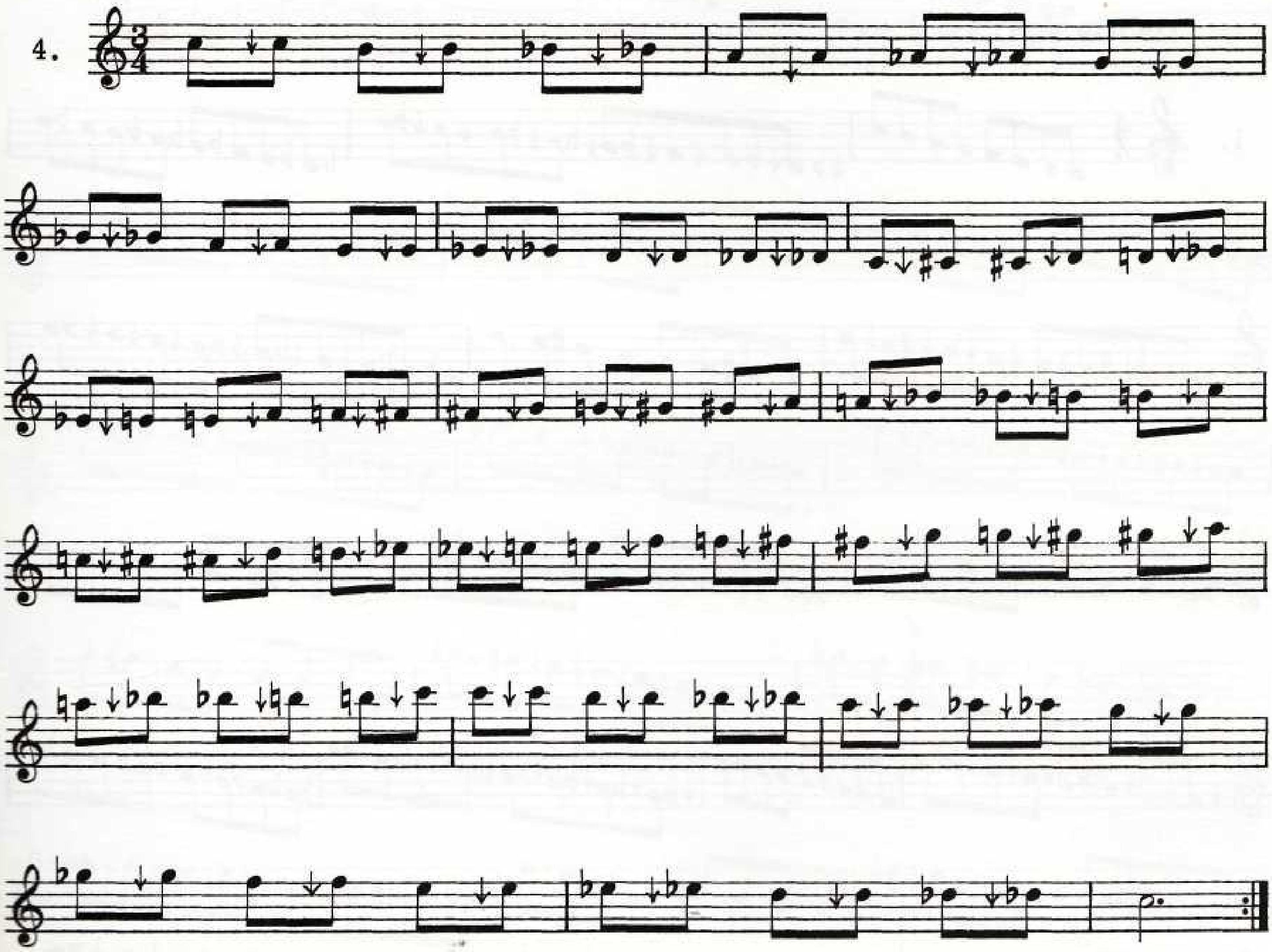

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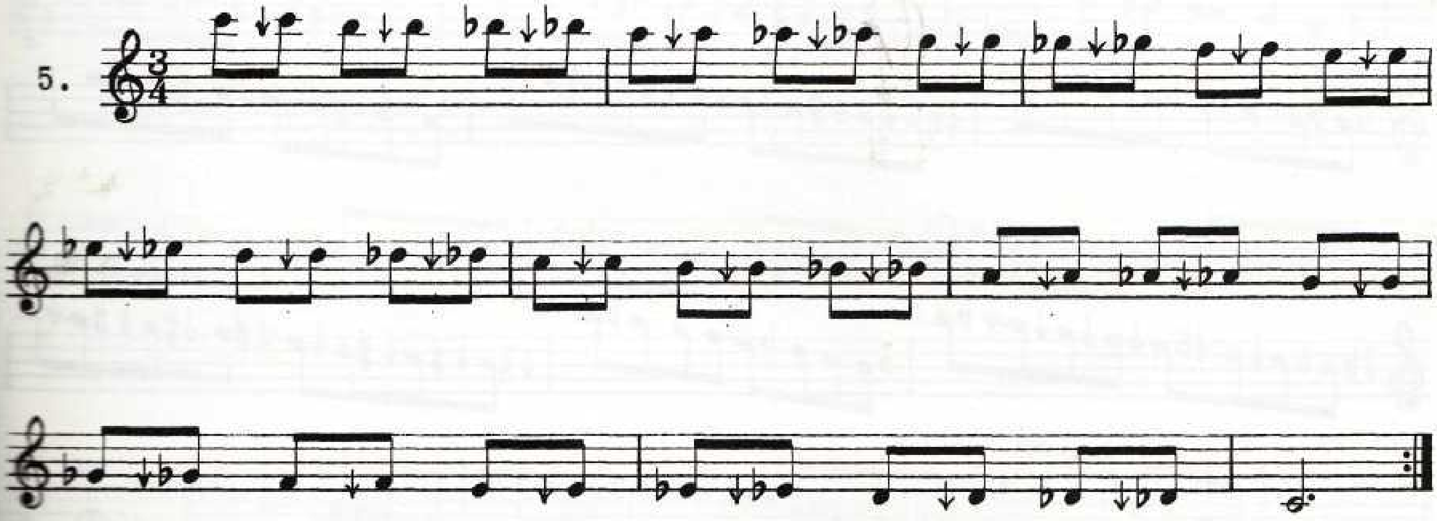

MAJOR SCALES

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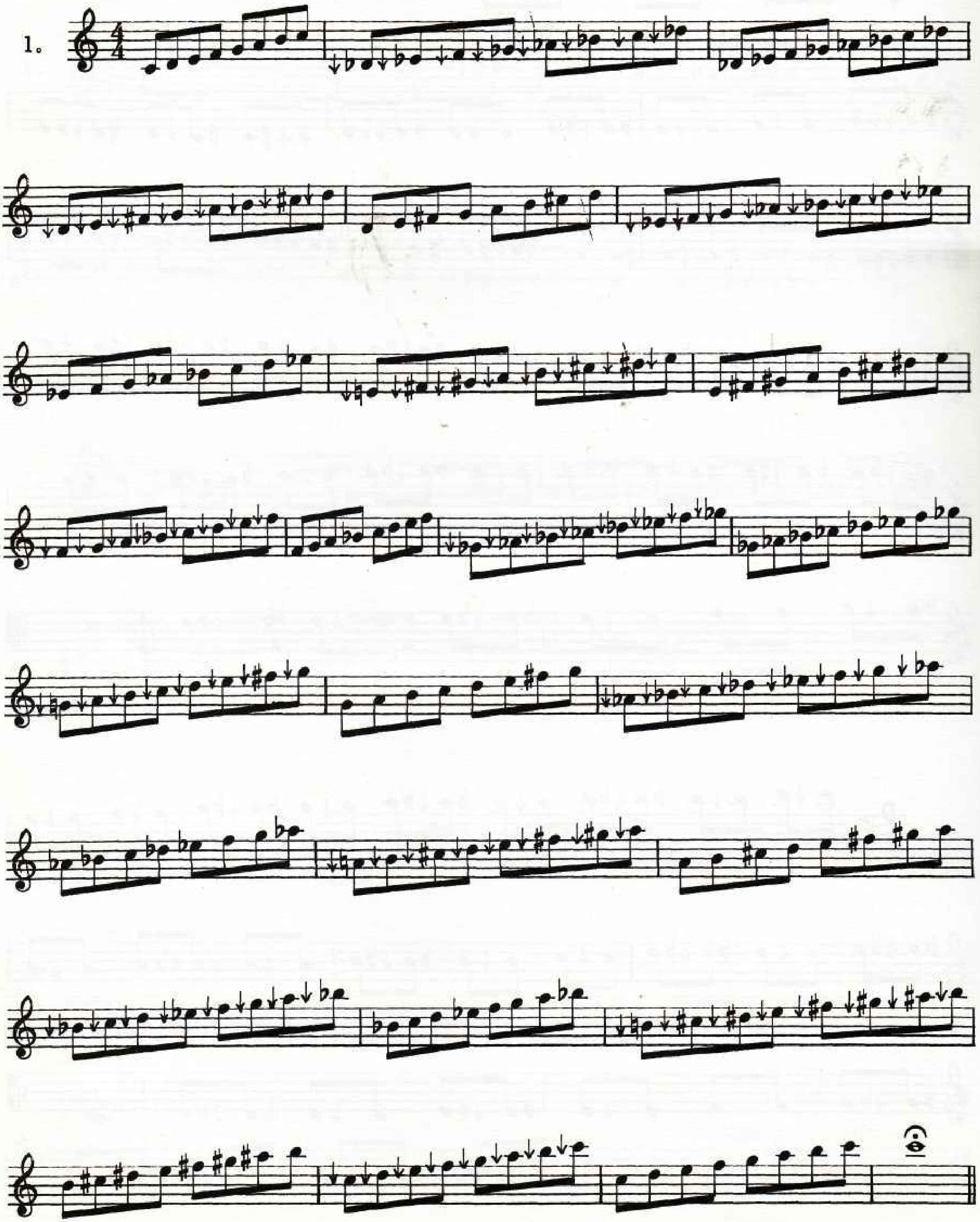

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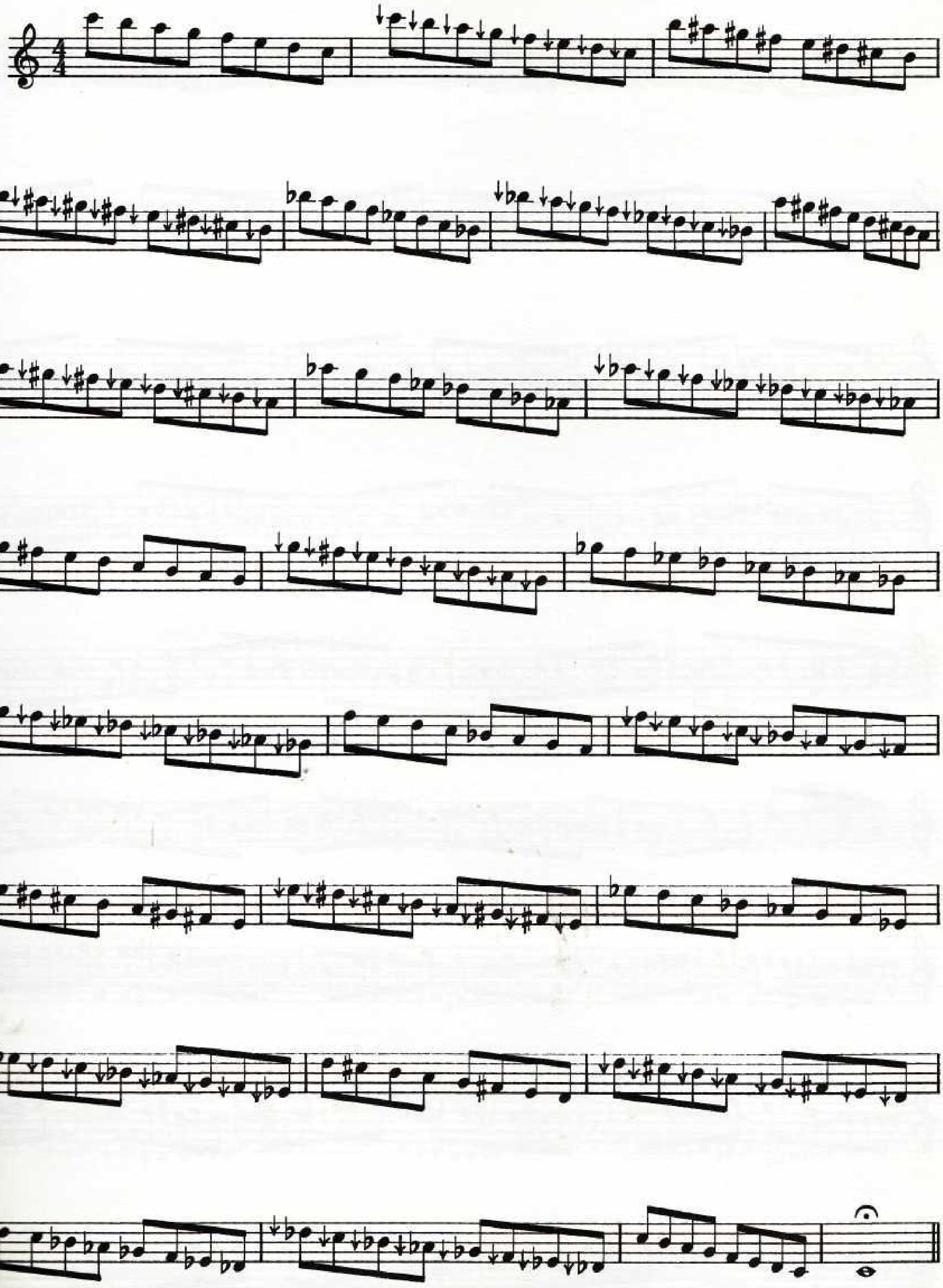

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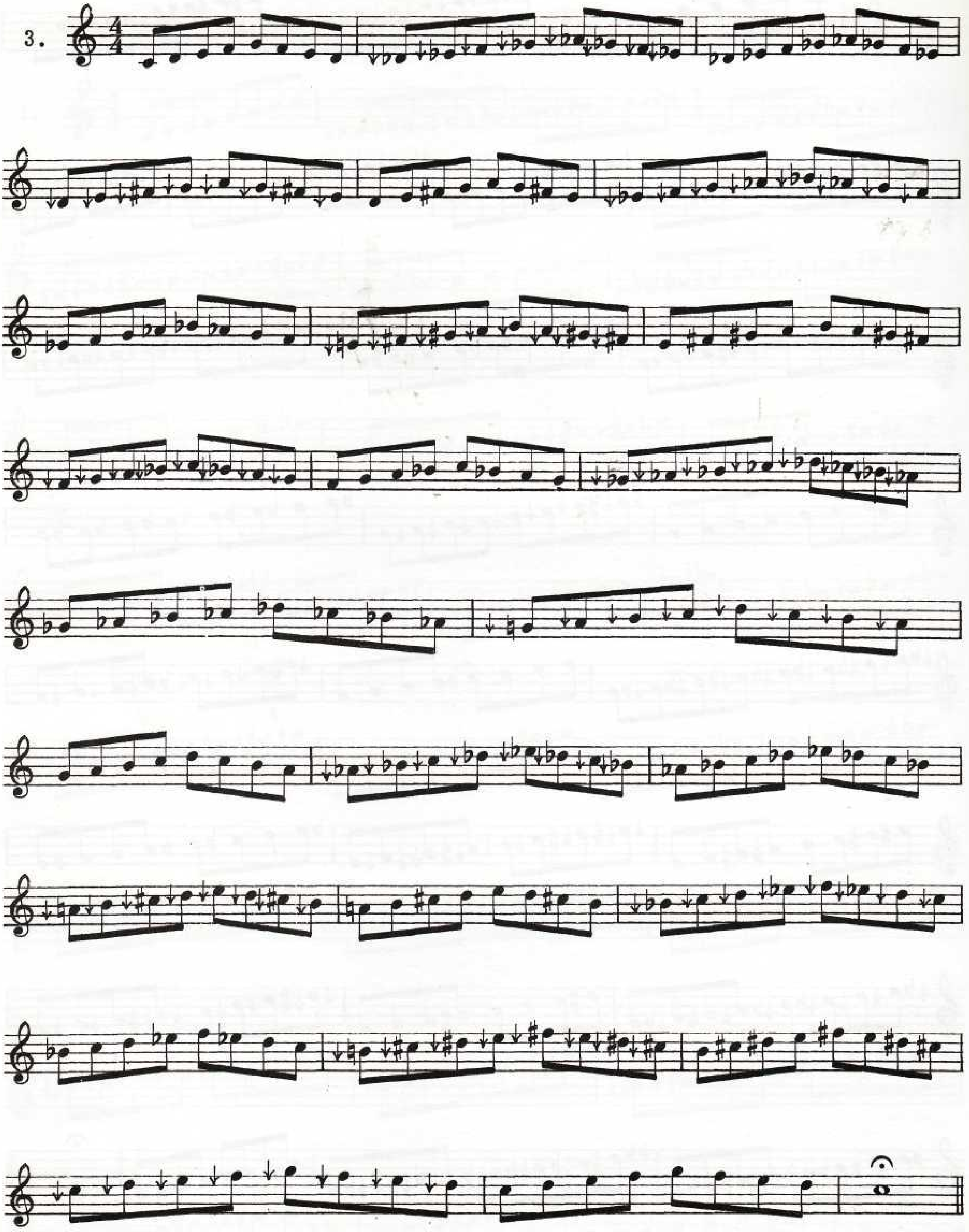

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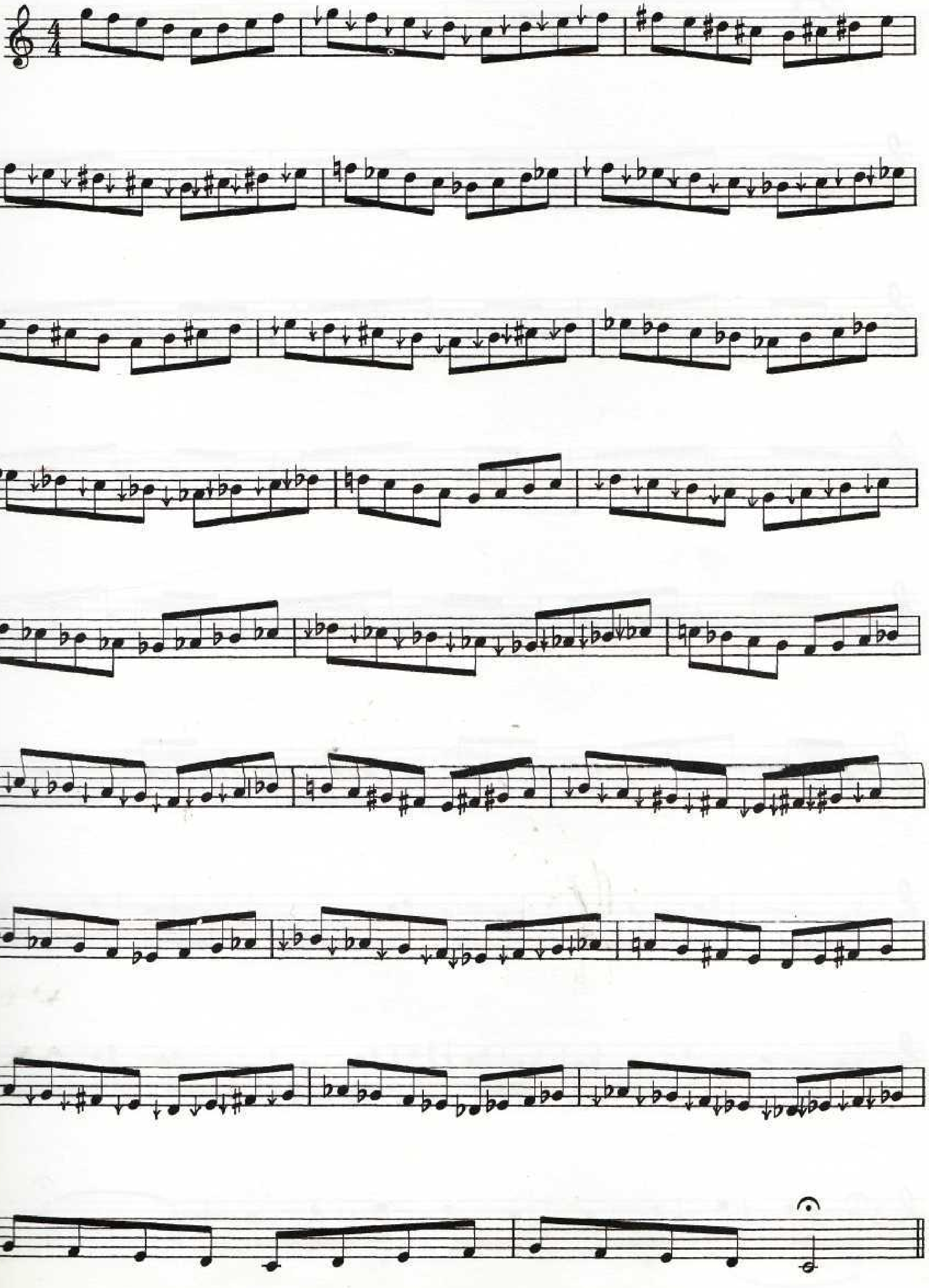

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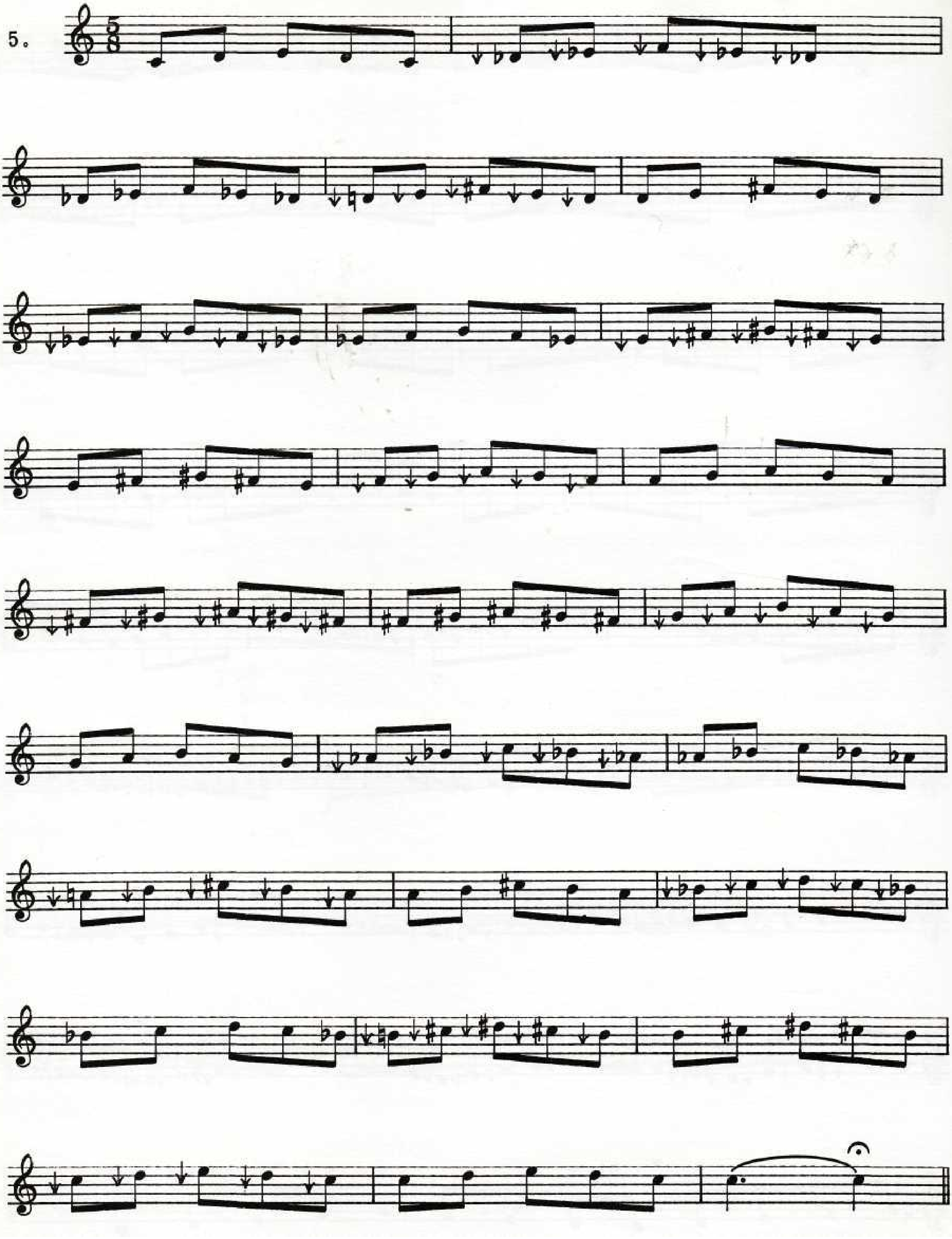

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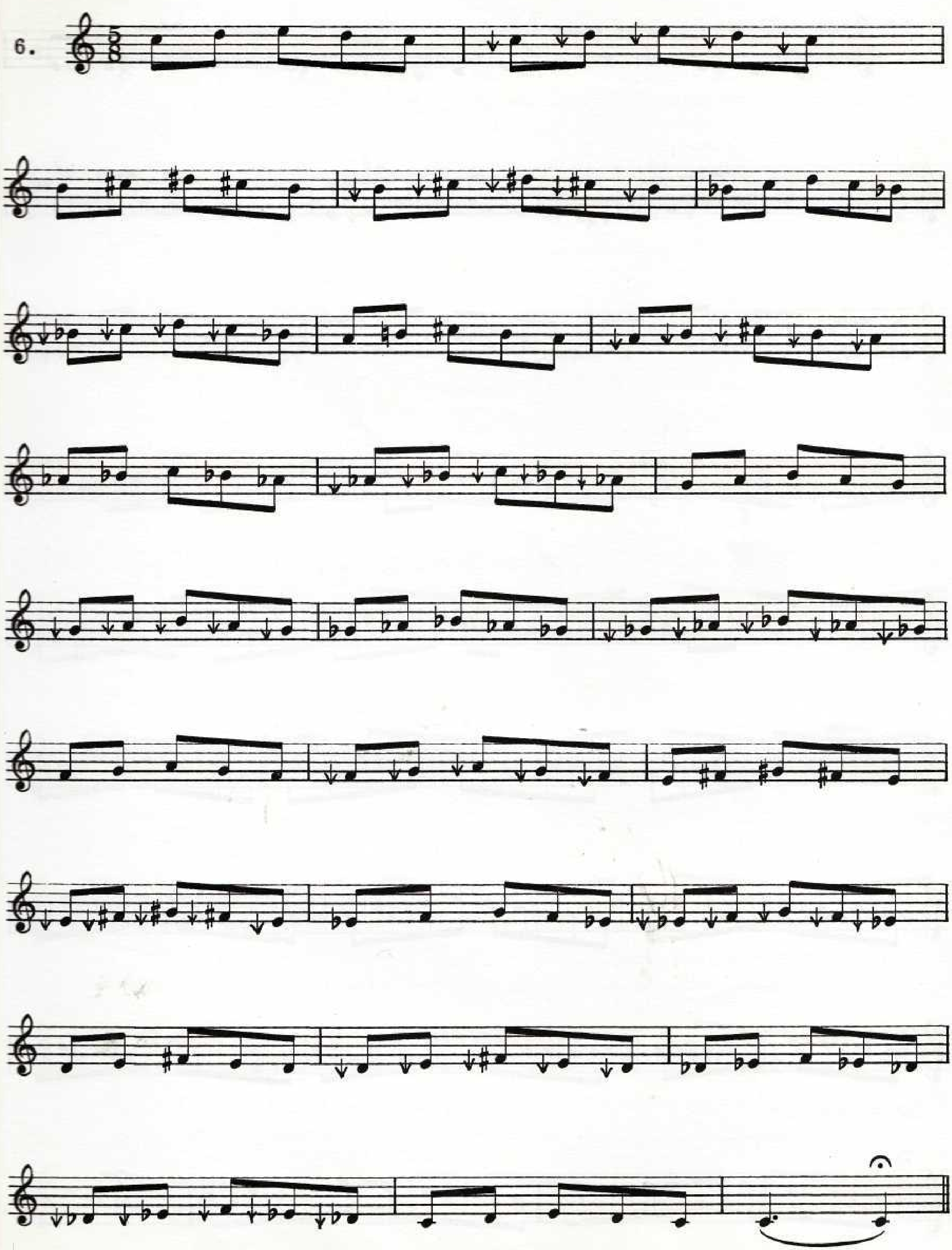

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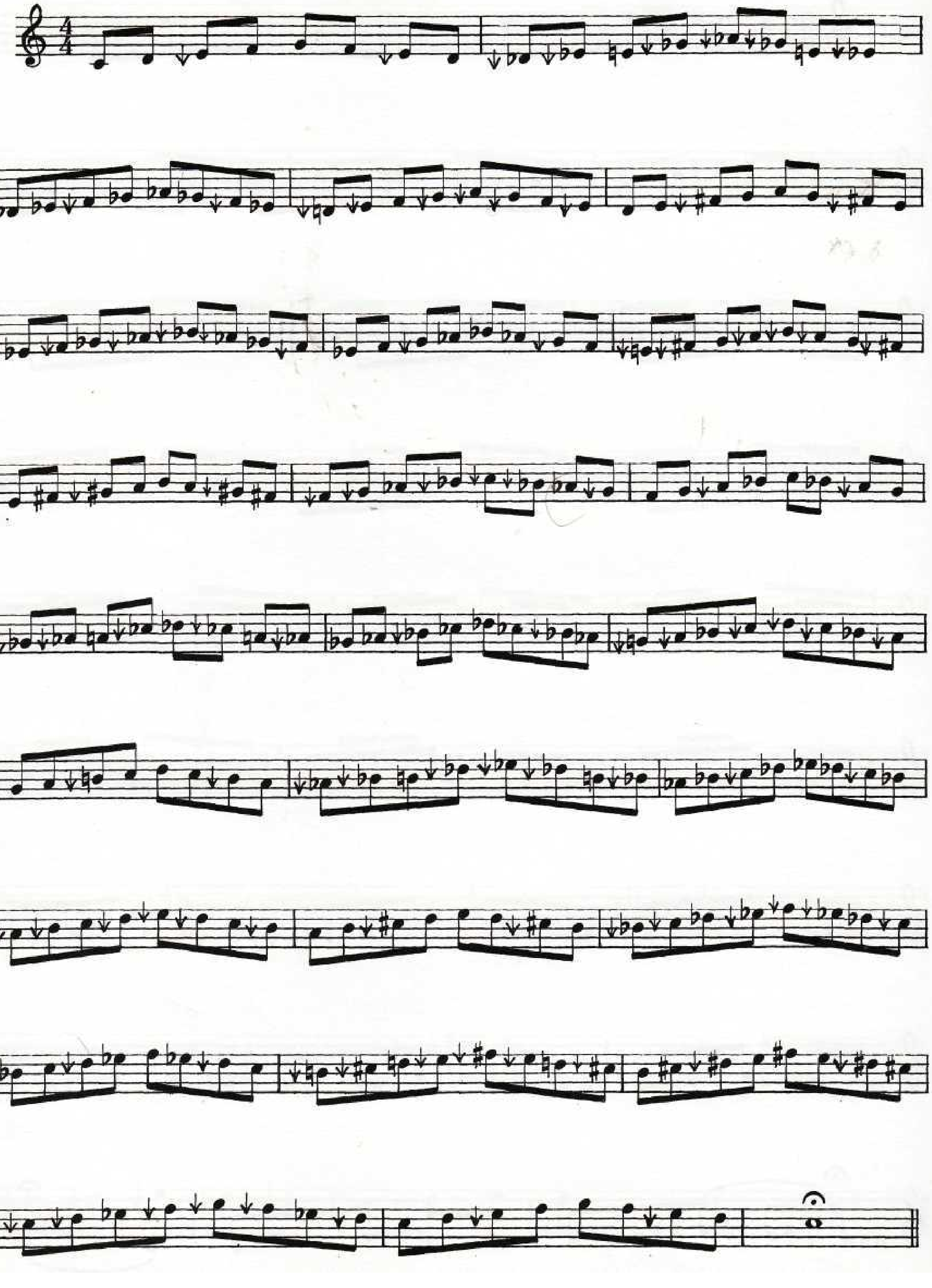

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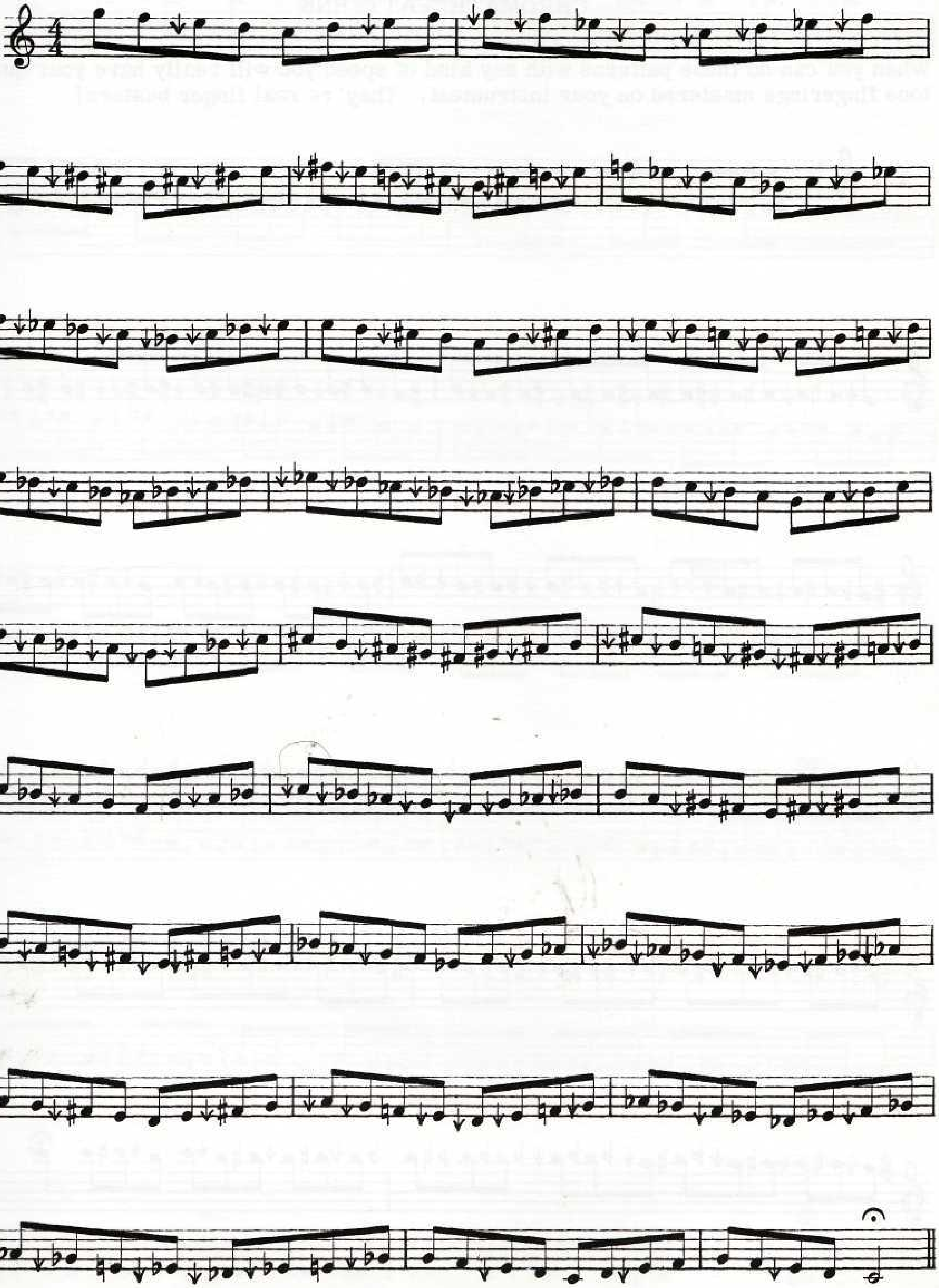

CHROMATIC PATTERNS

When you can do these patterns with any kind of speed you will really have your quarter-tone fingerings mastered on your instrument. They're real finger busters!

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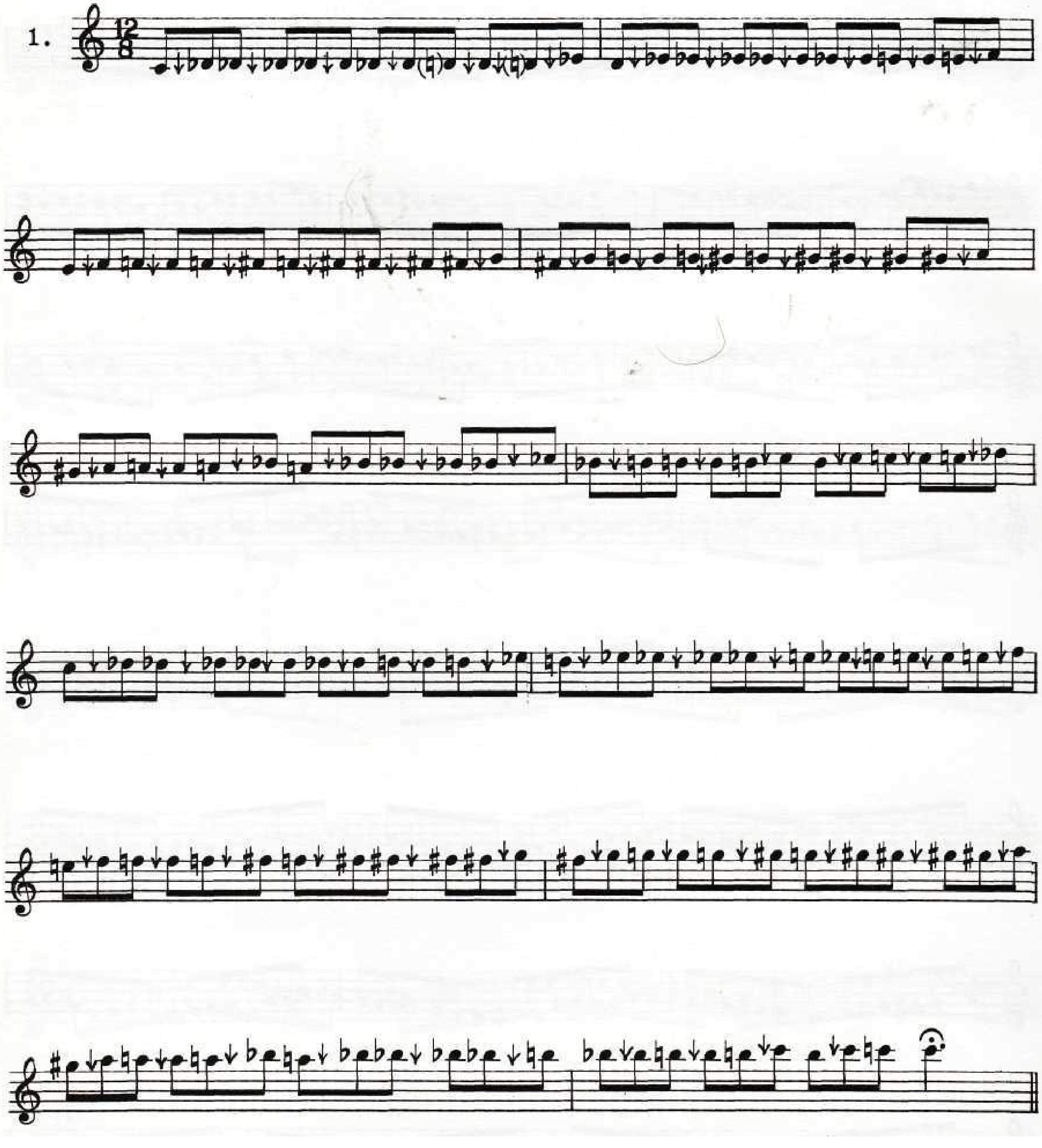

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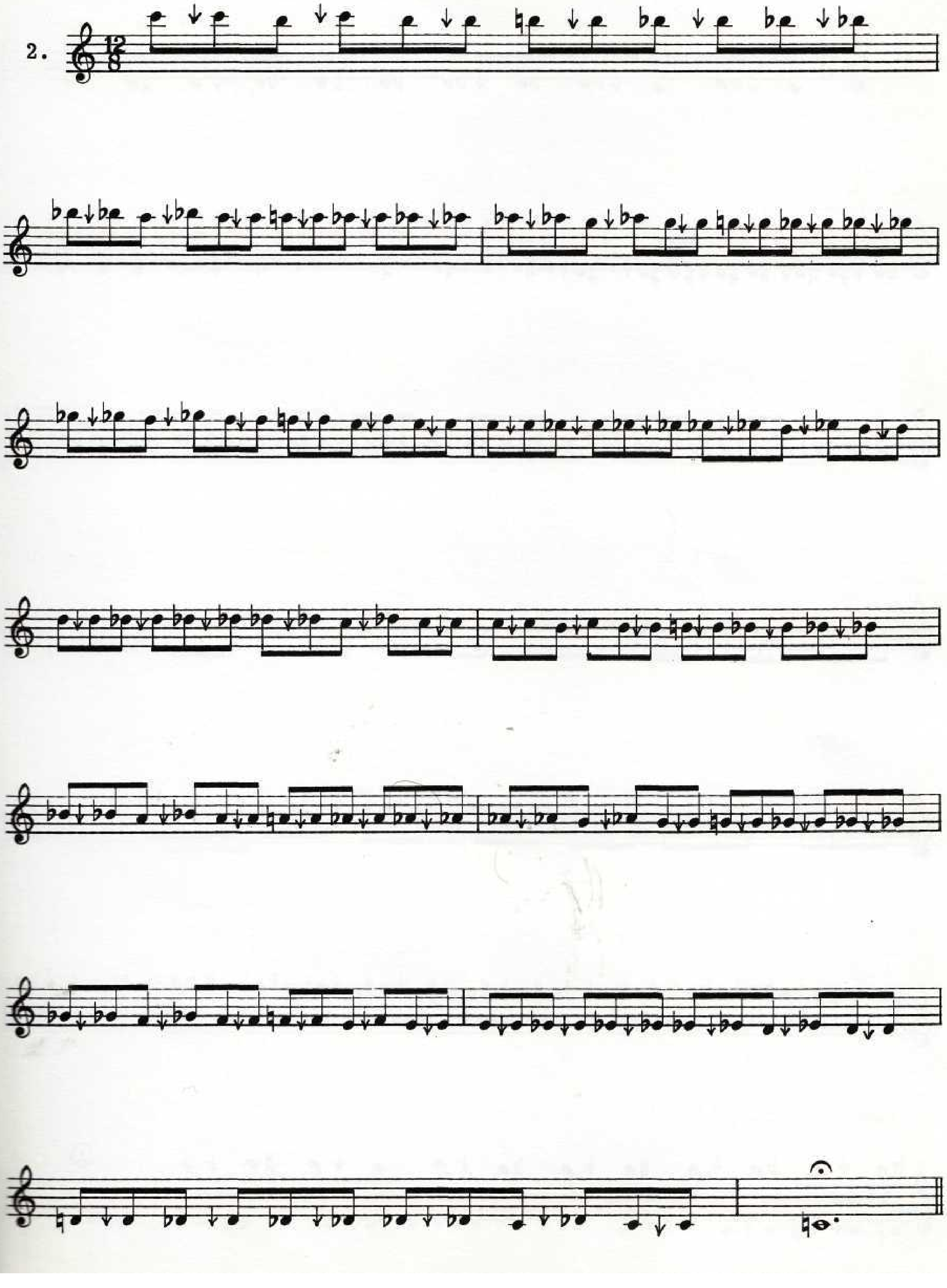

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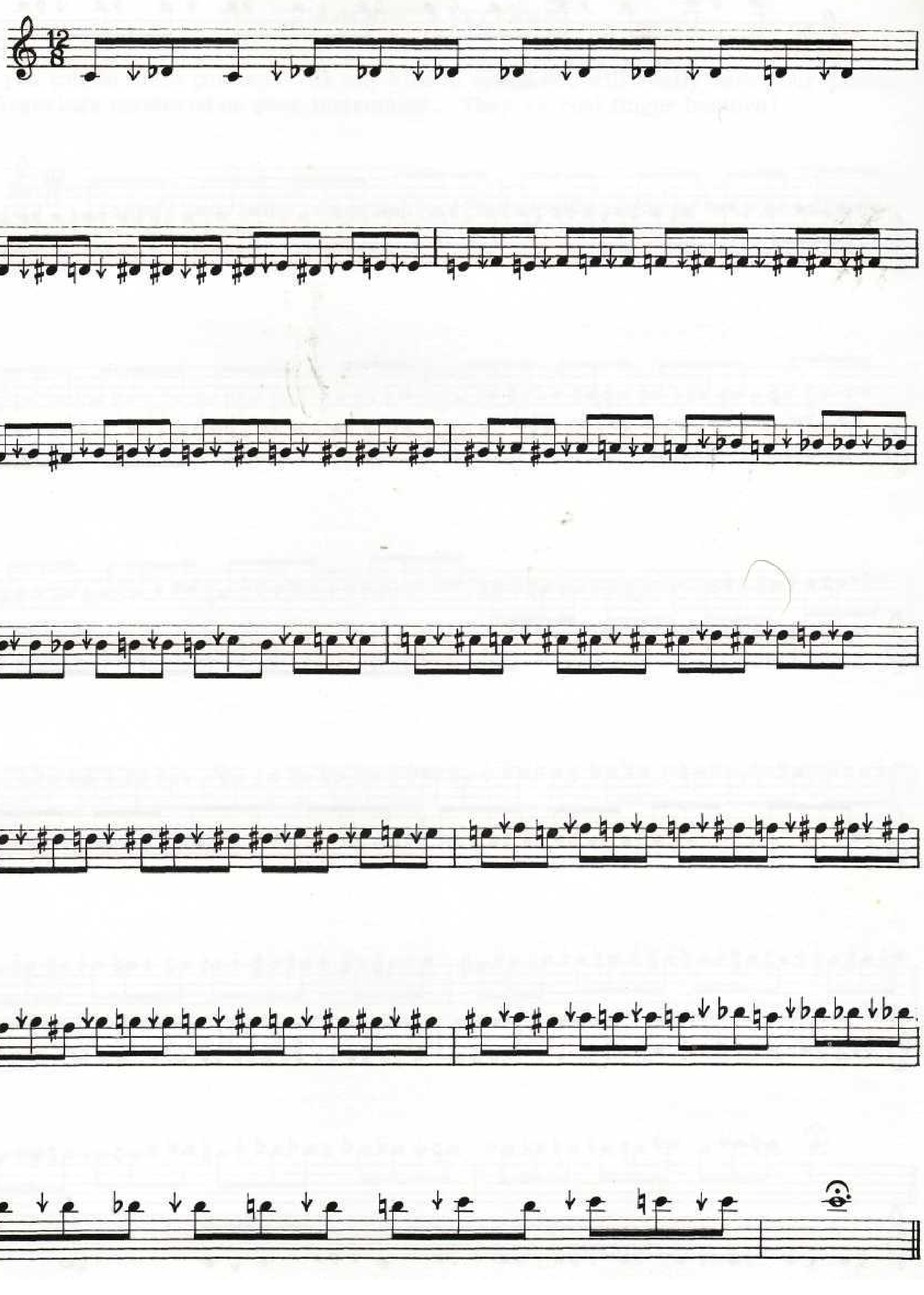

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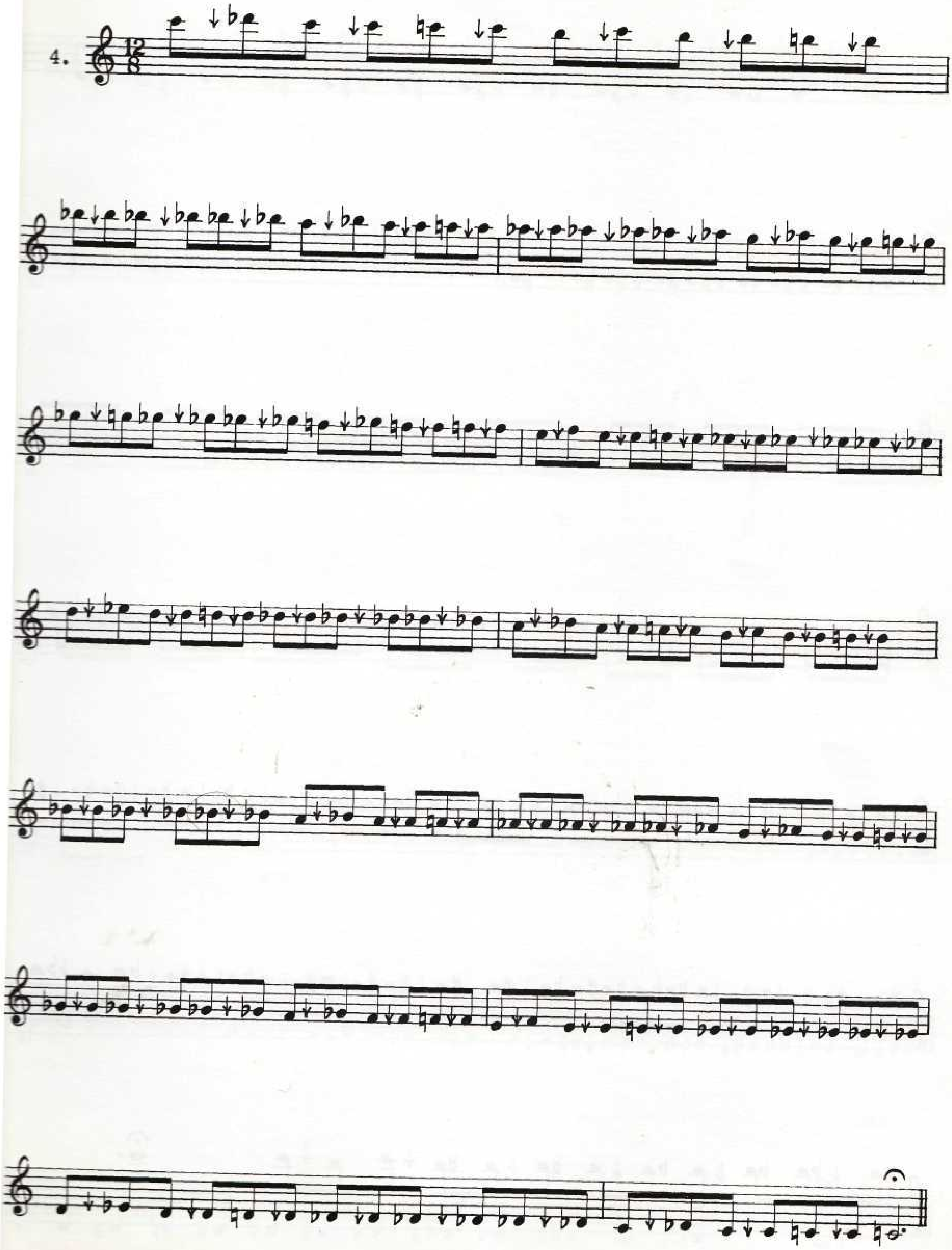

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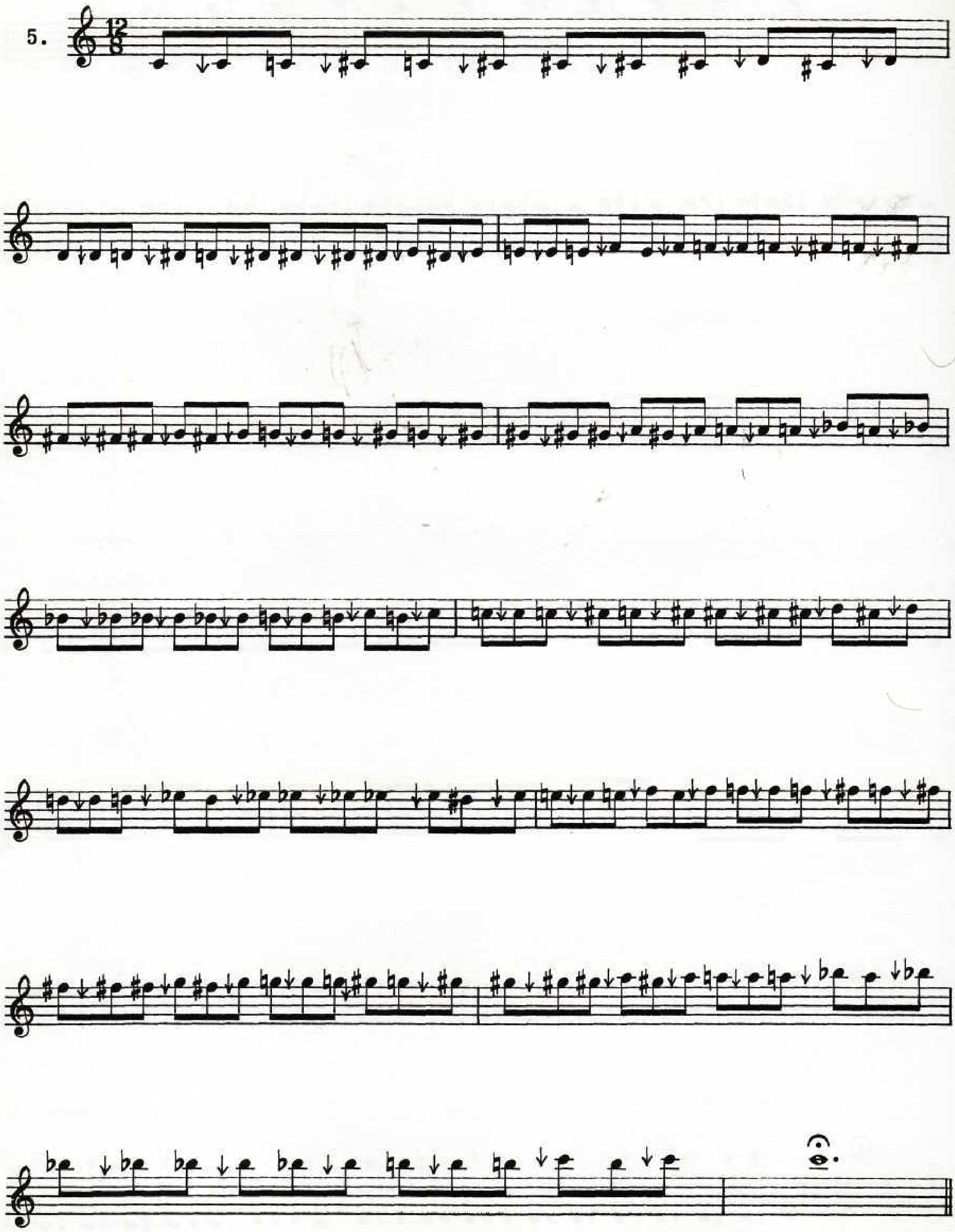

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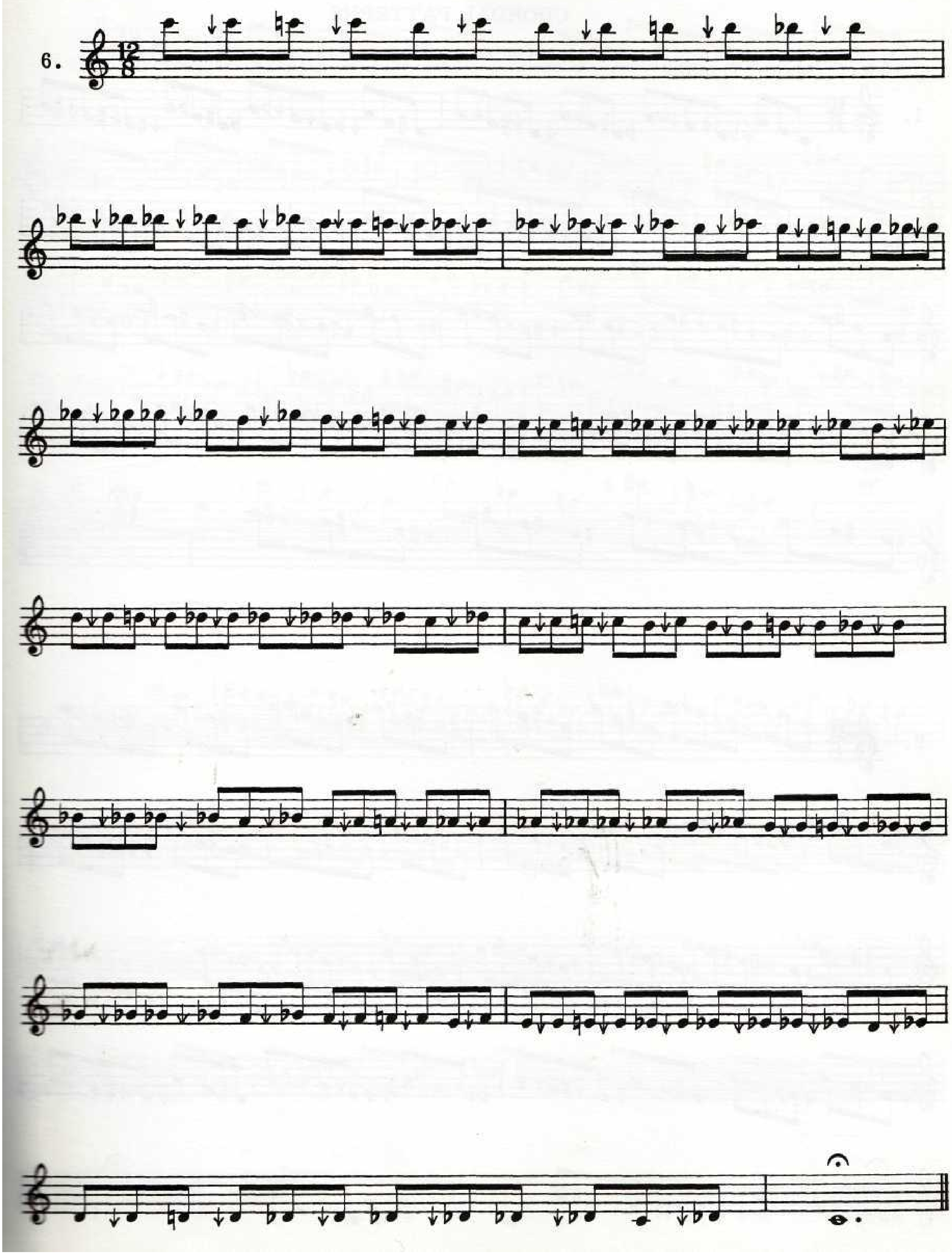

CHORDAL PATTERNS

(Major Triads)

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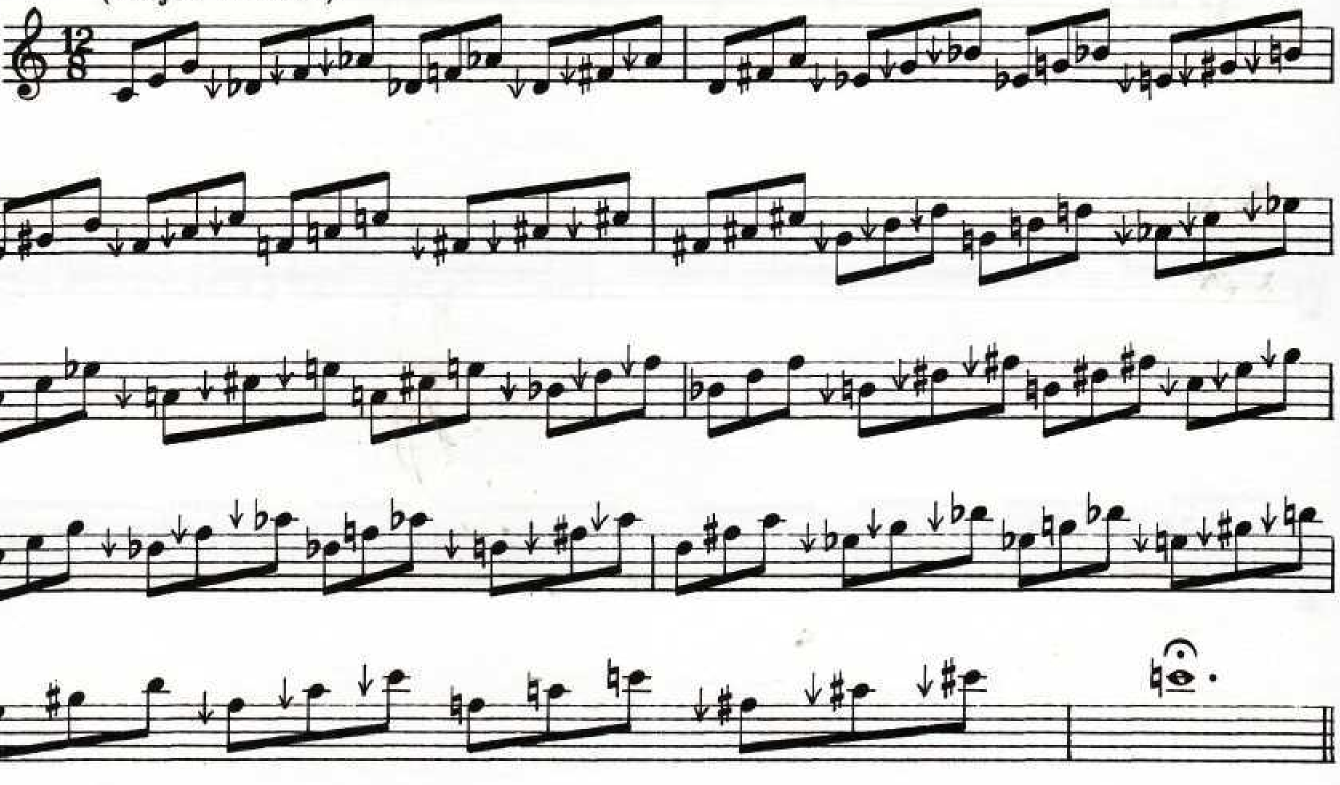

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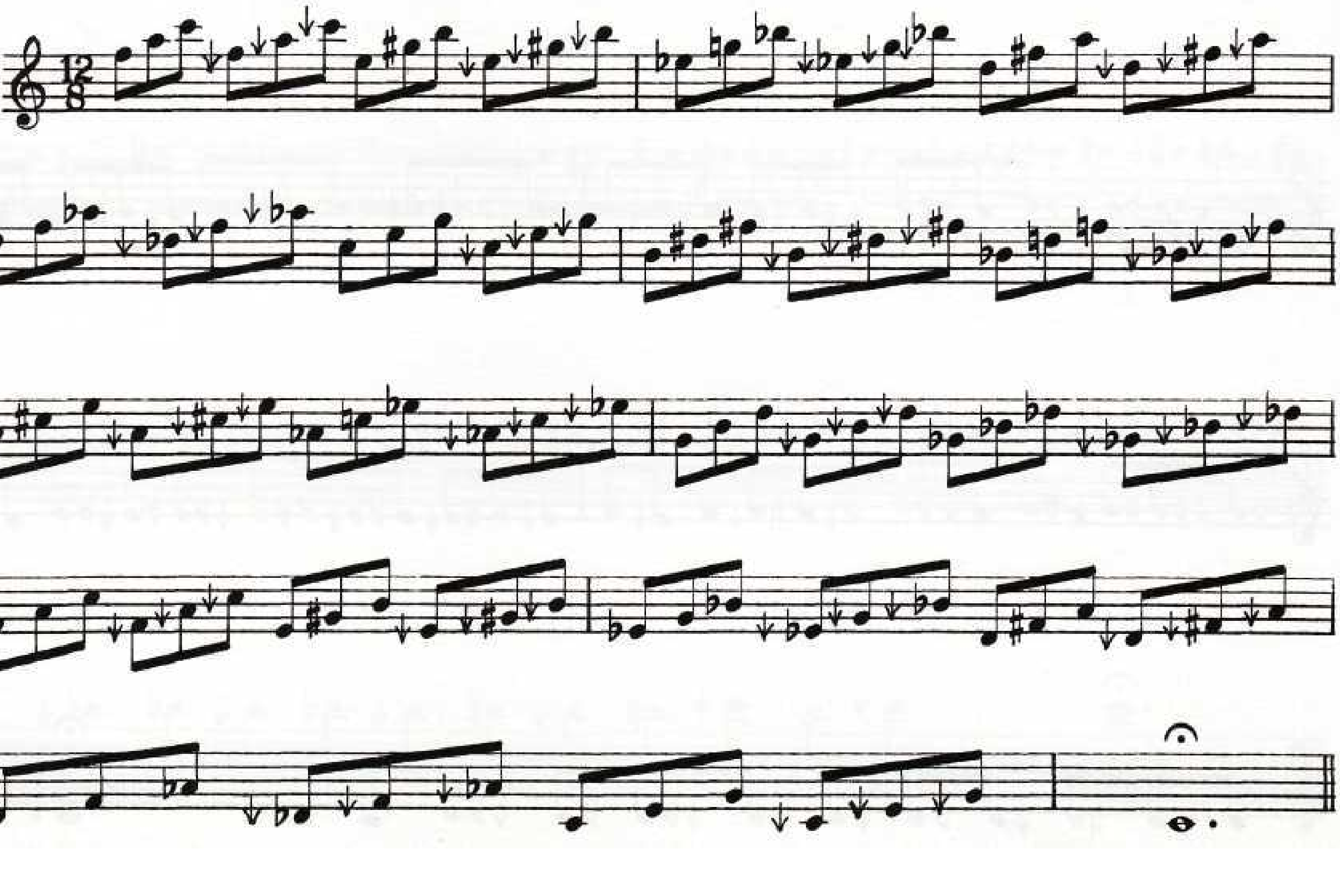

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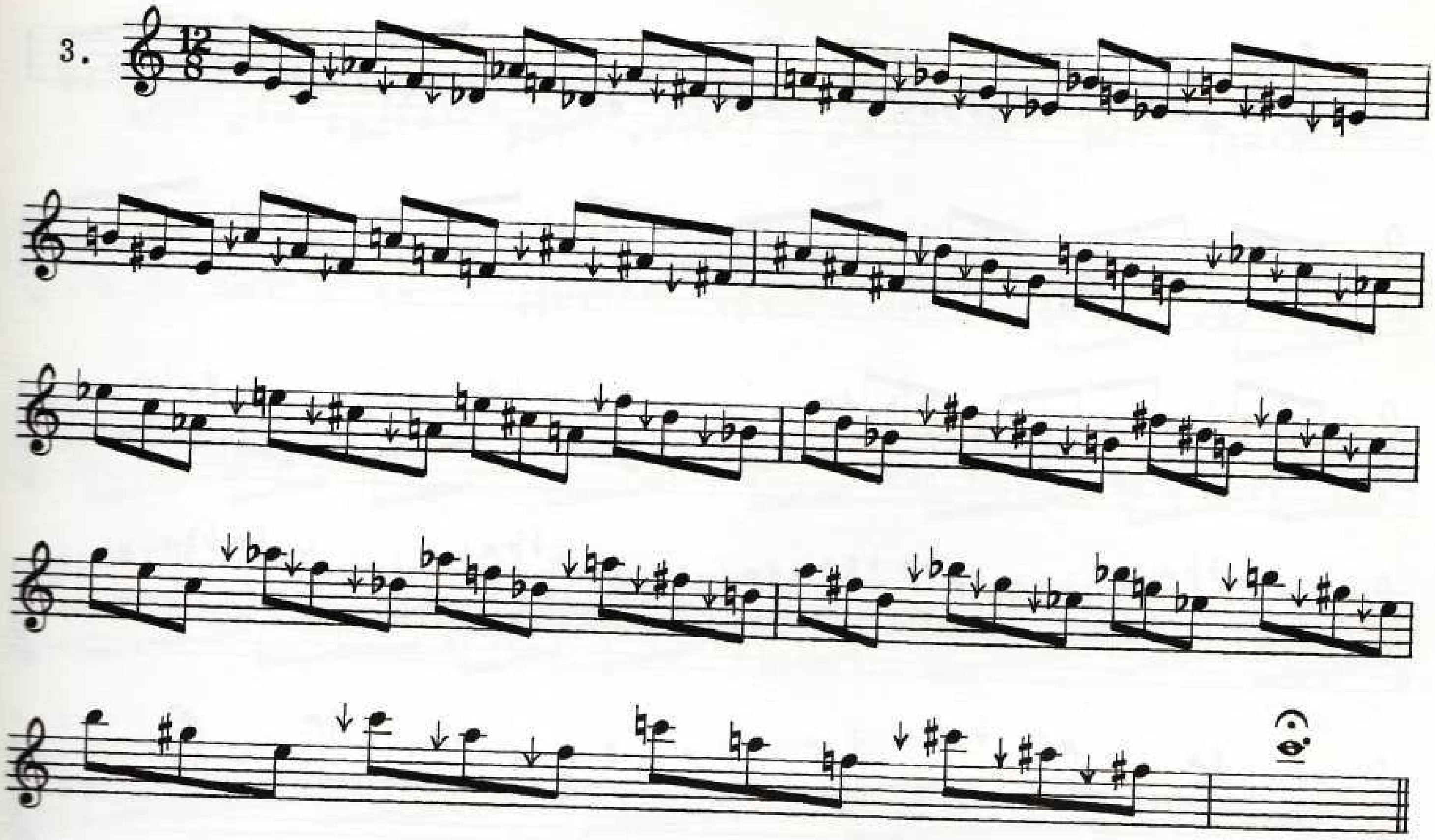

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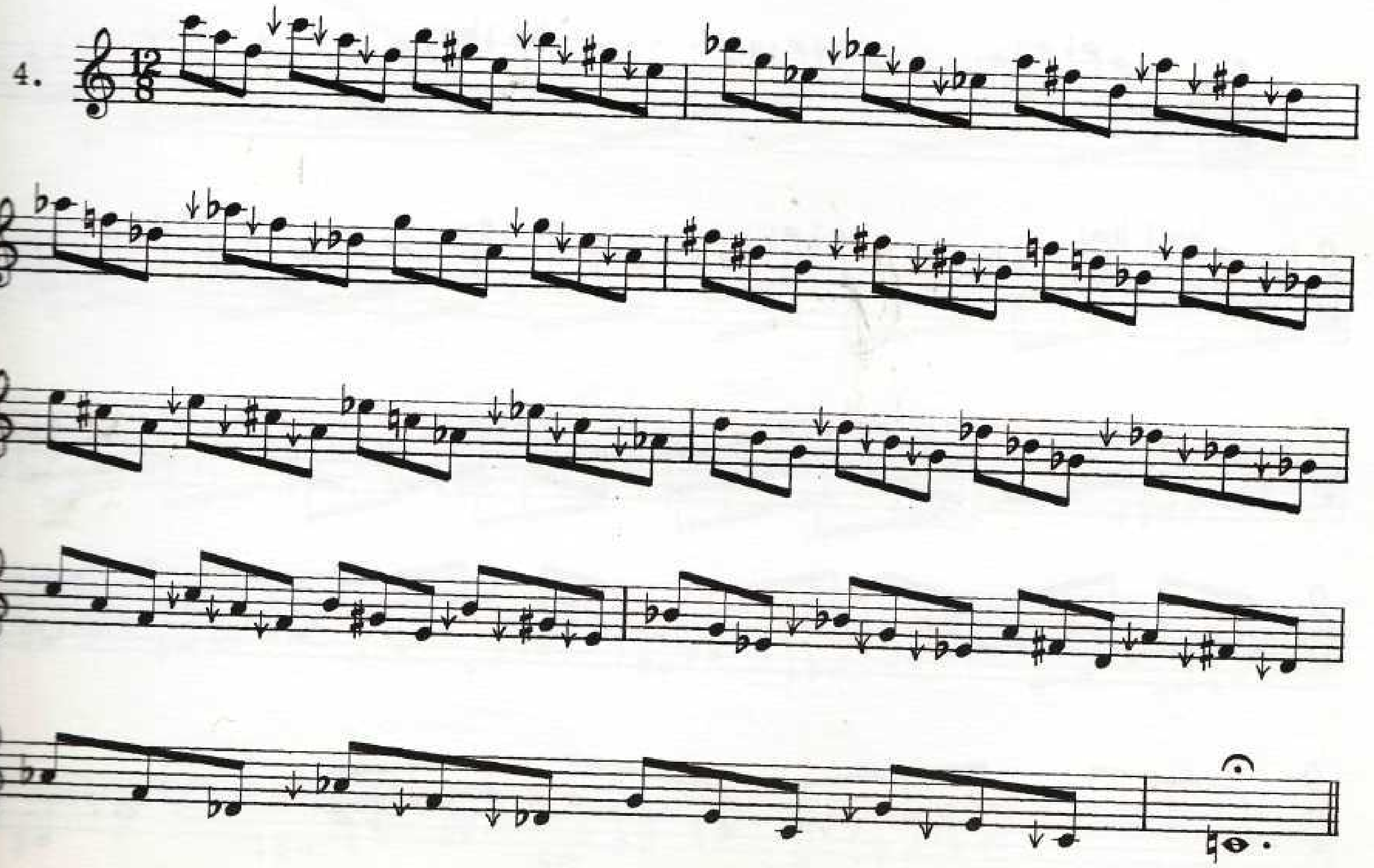

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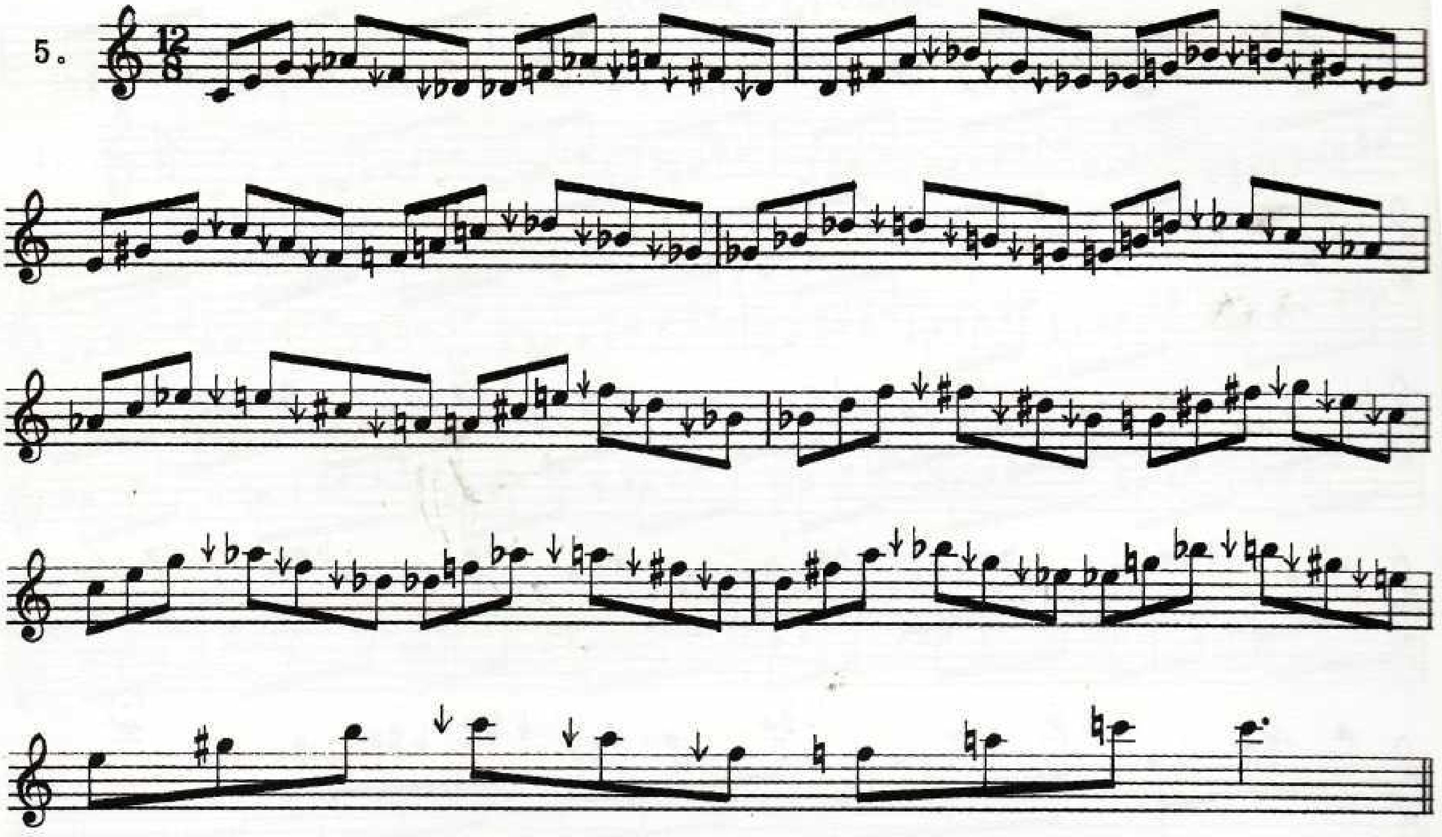

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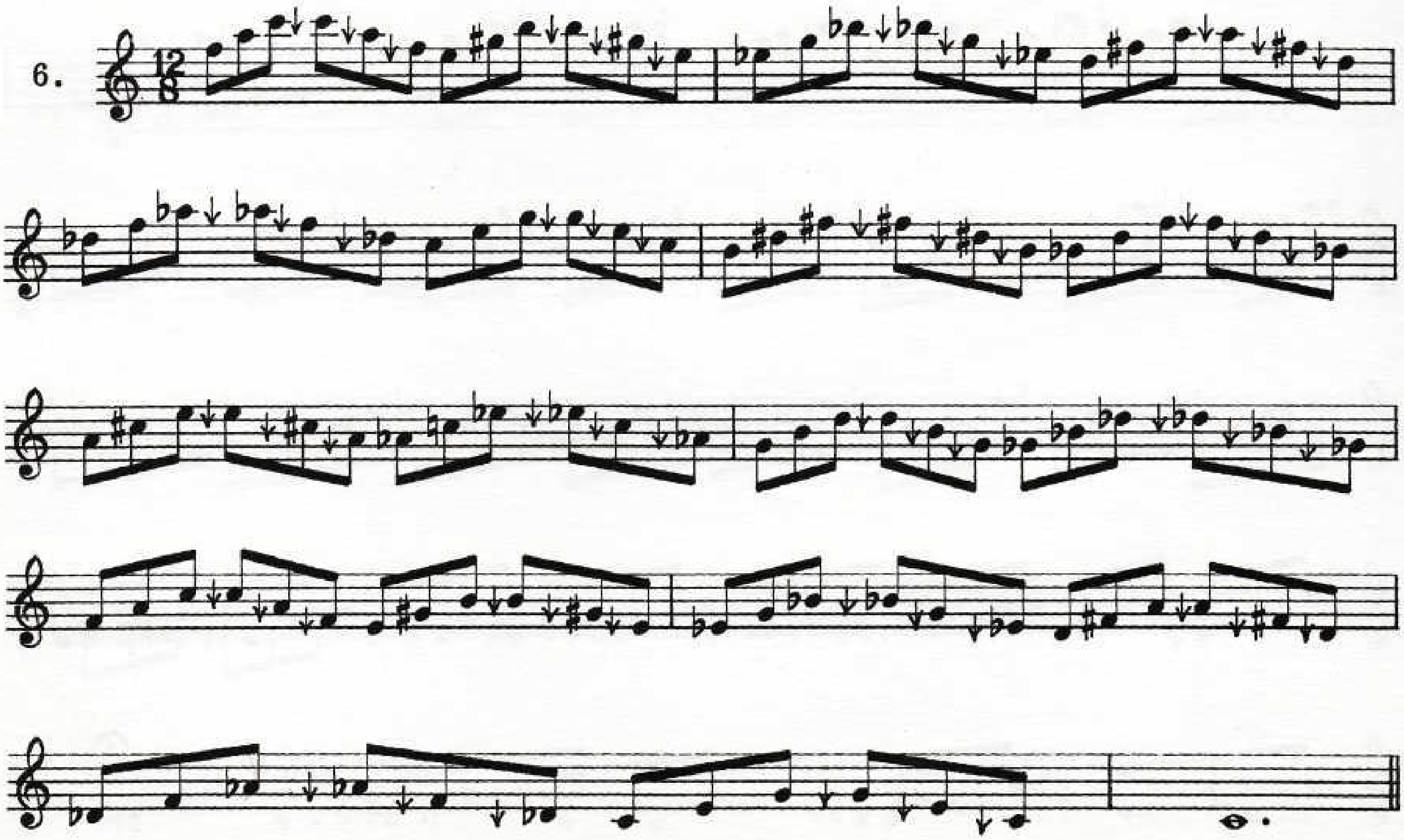

(Minor Triads)

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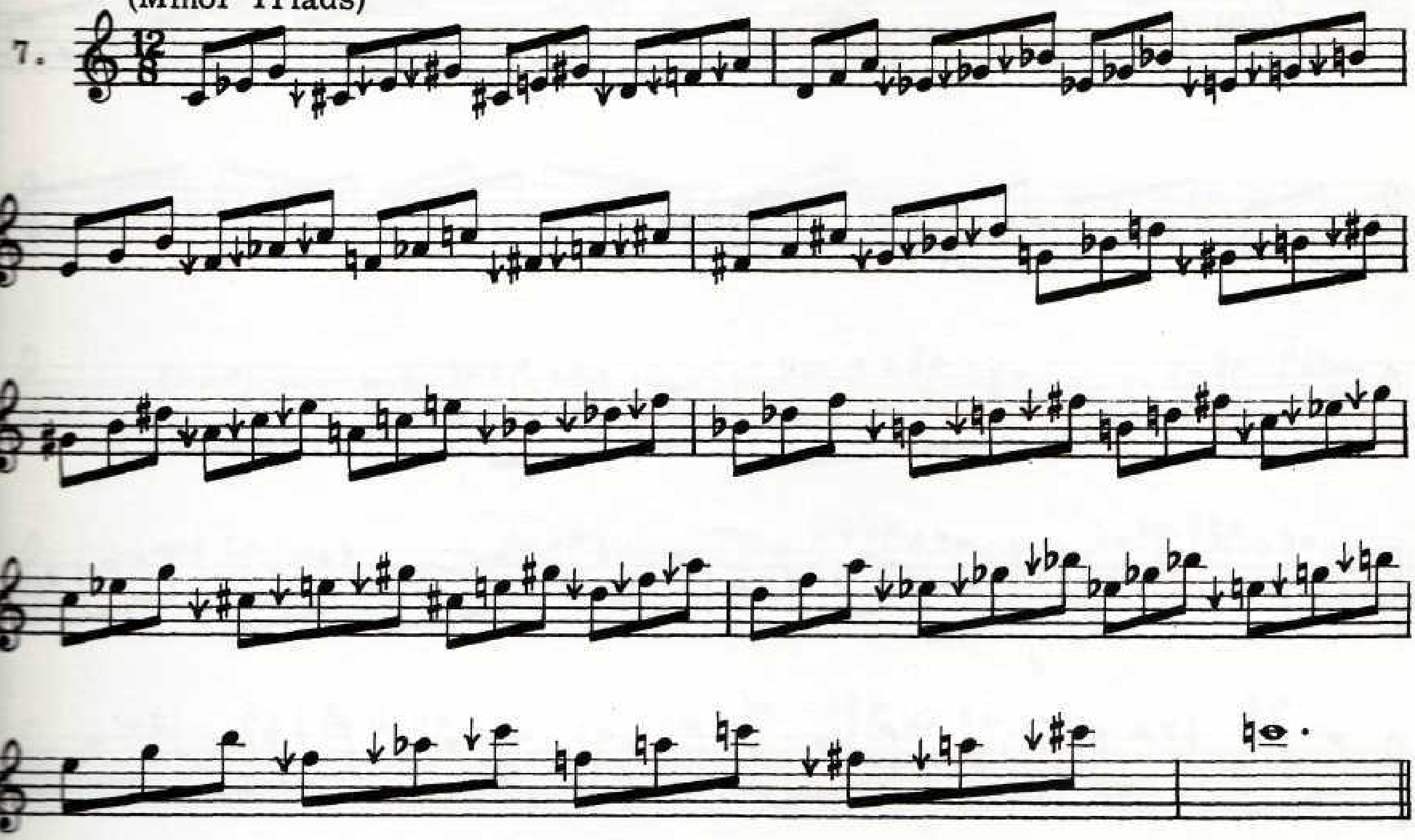

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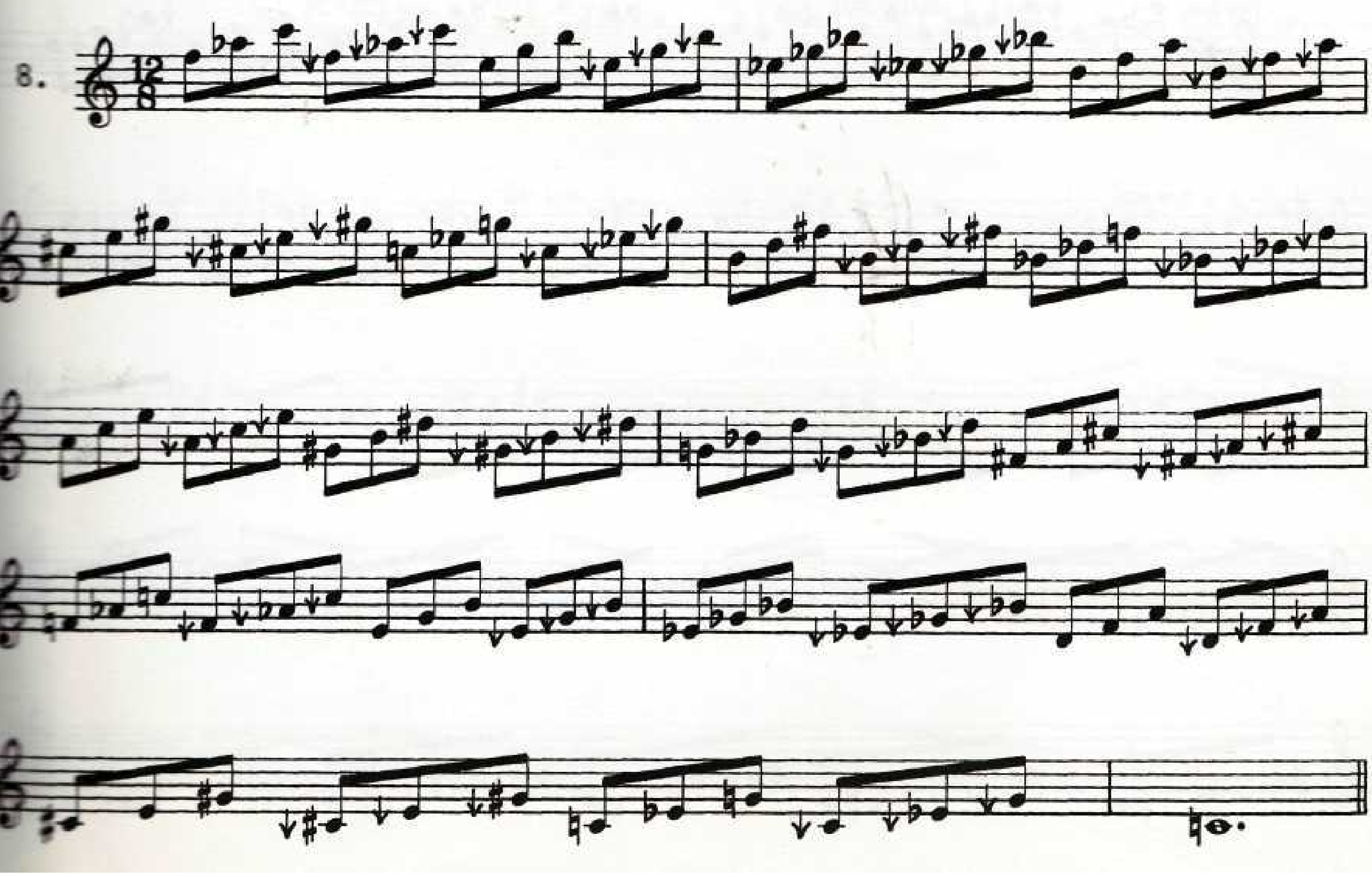

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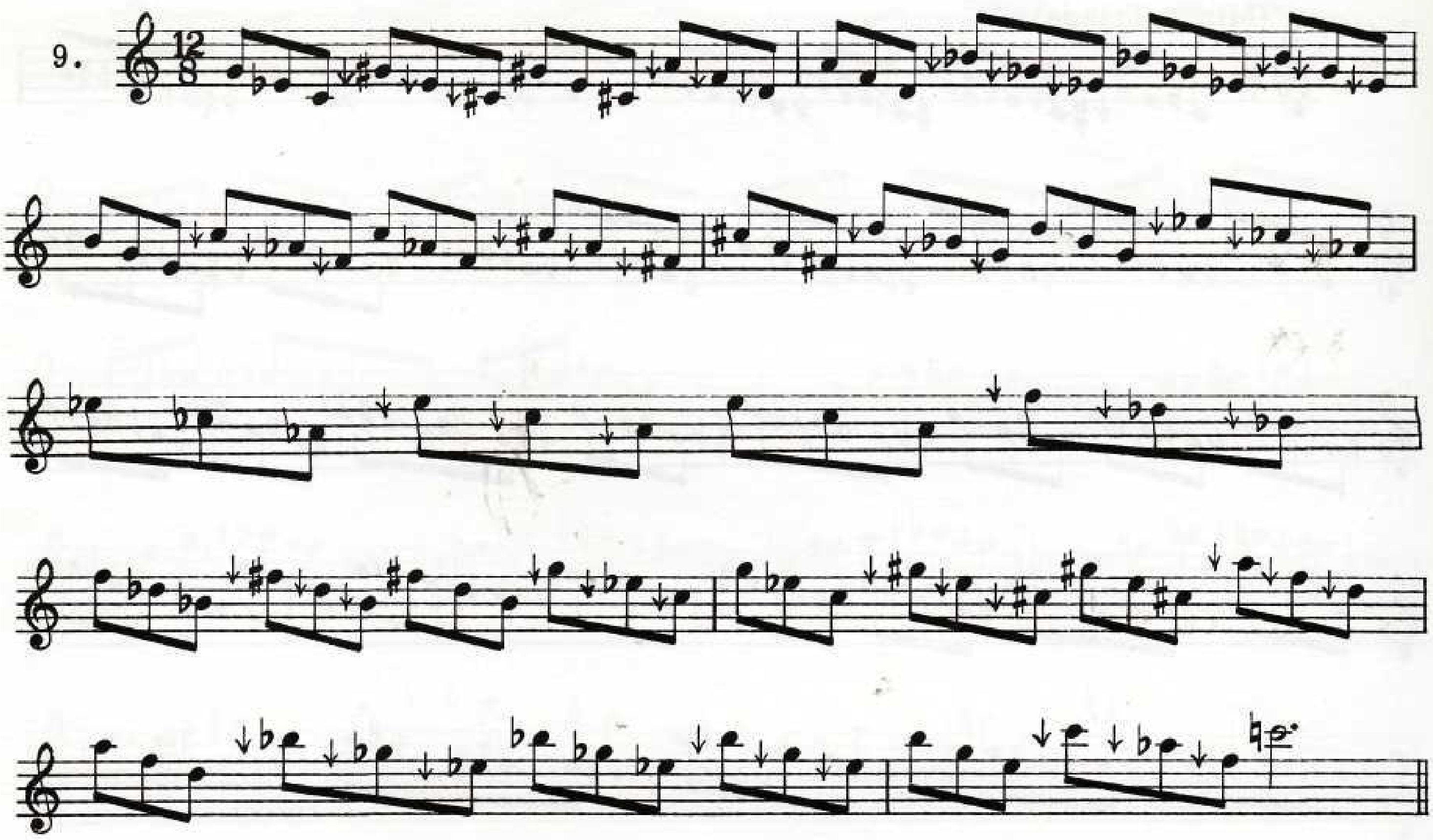

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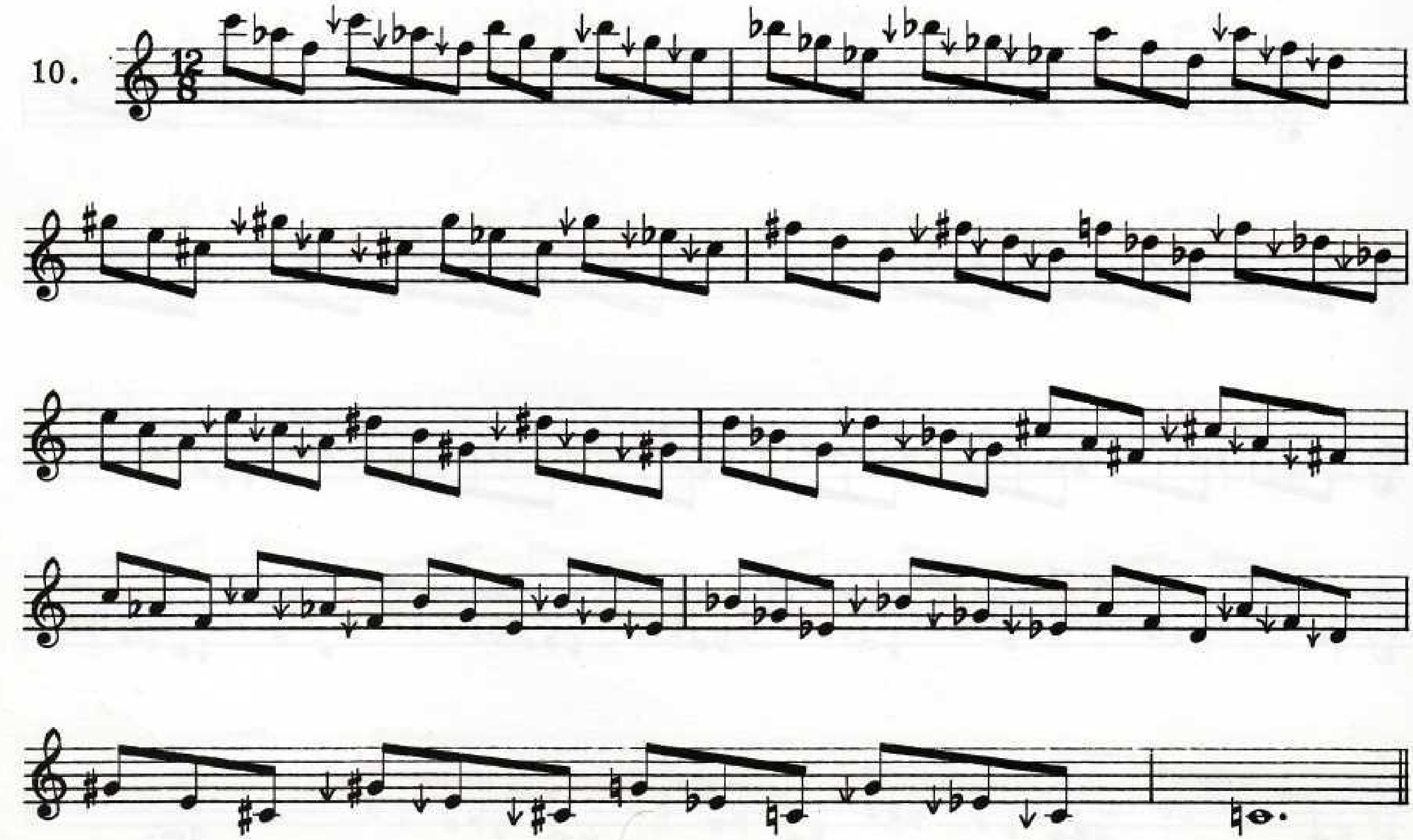

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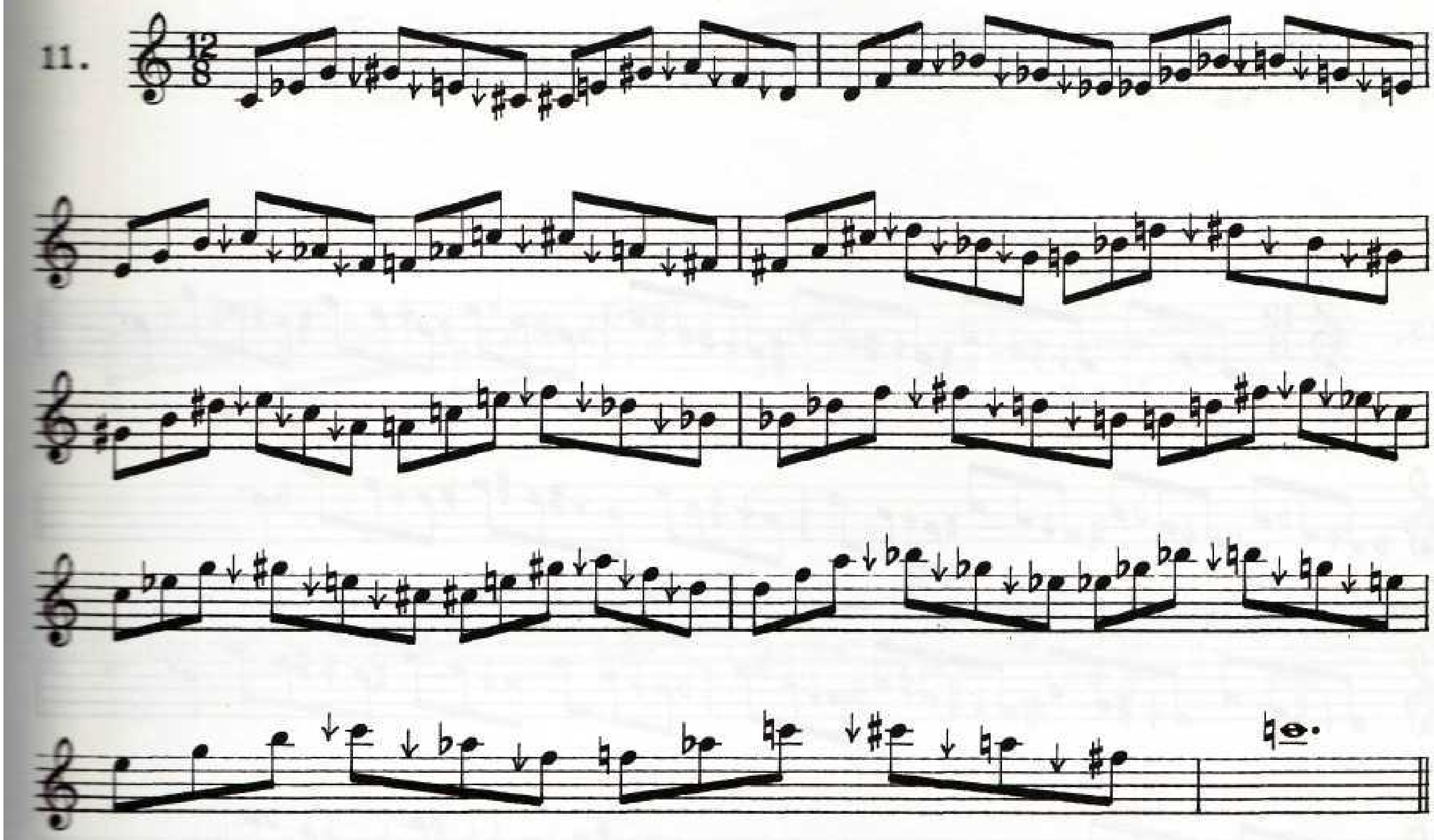

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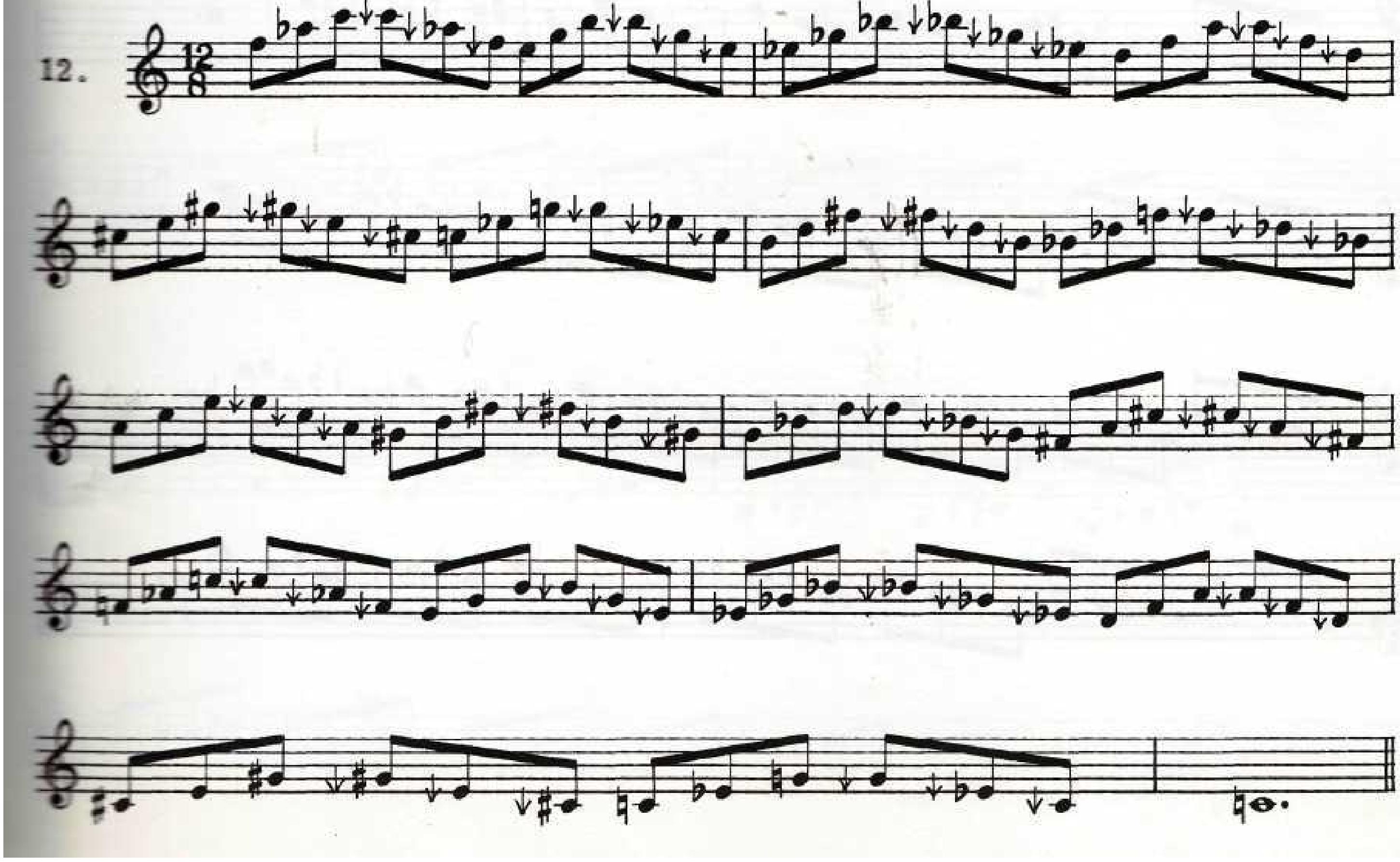

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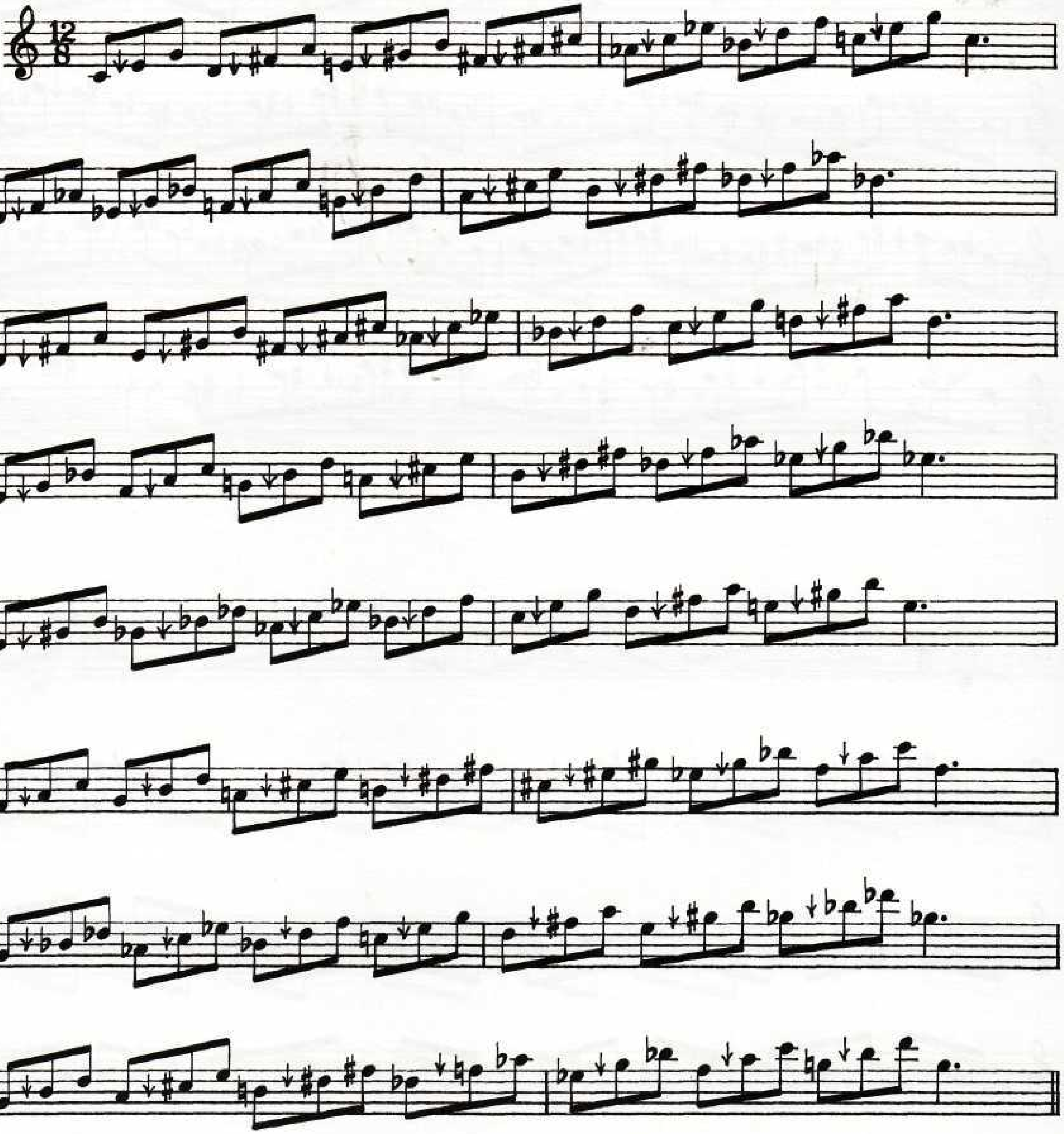

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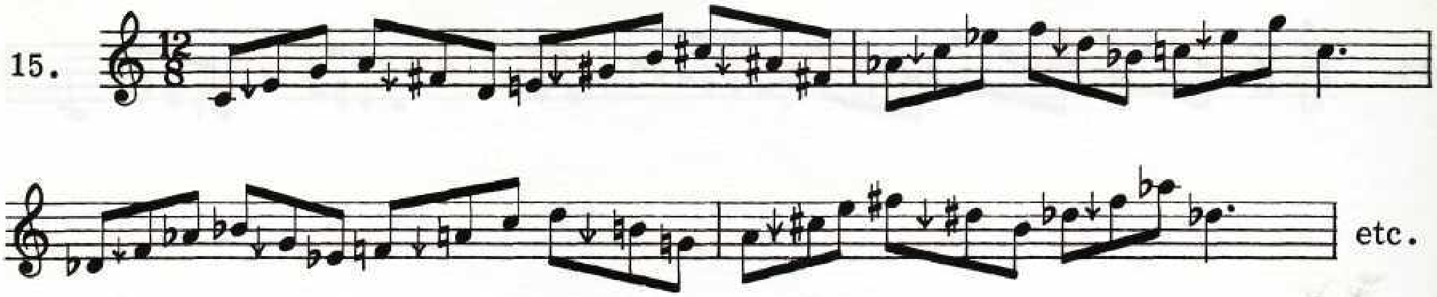

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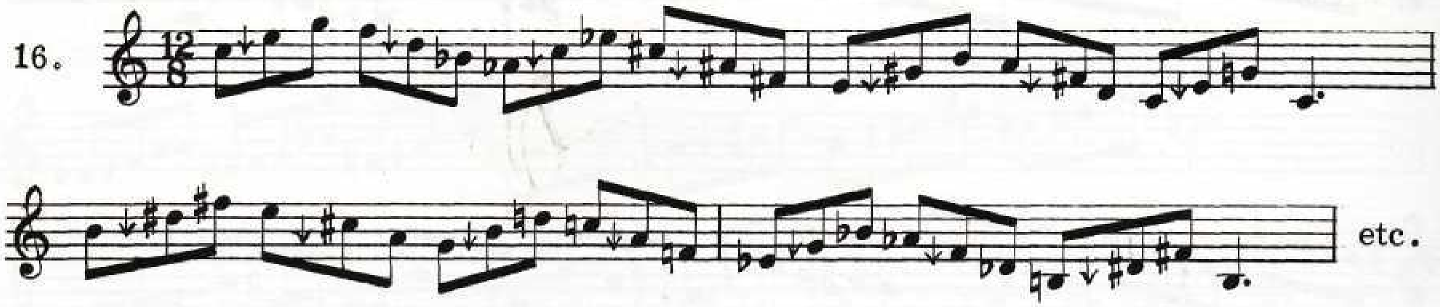

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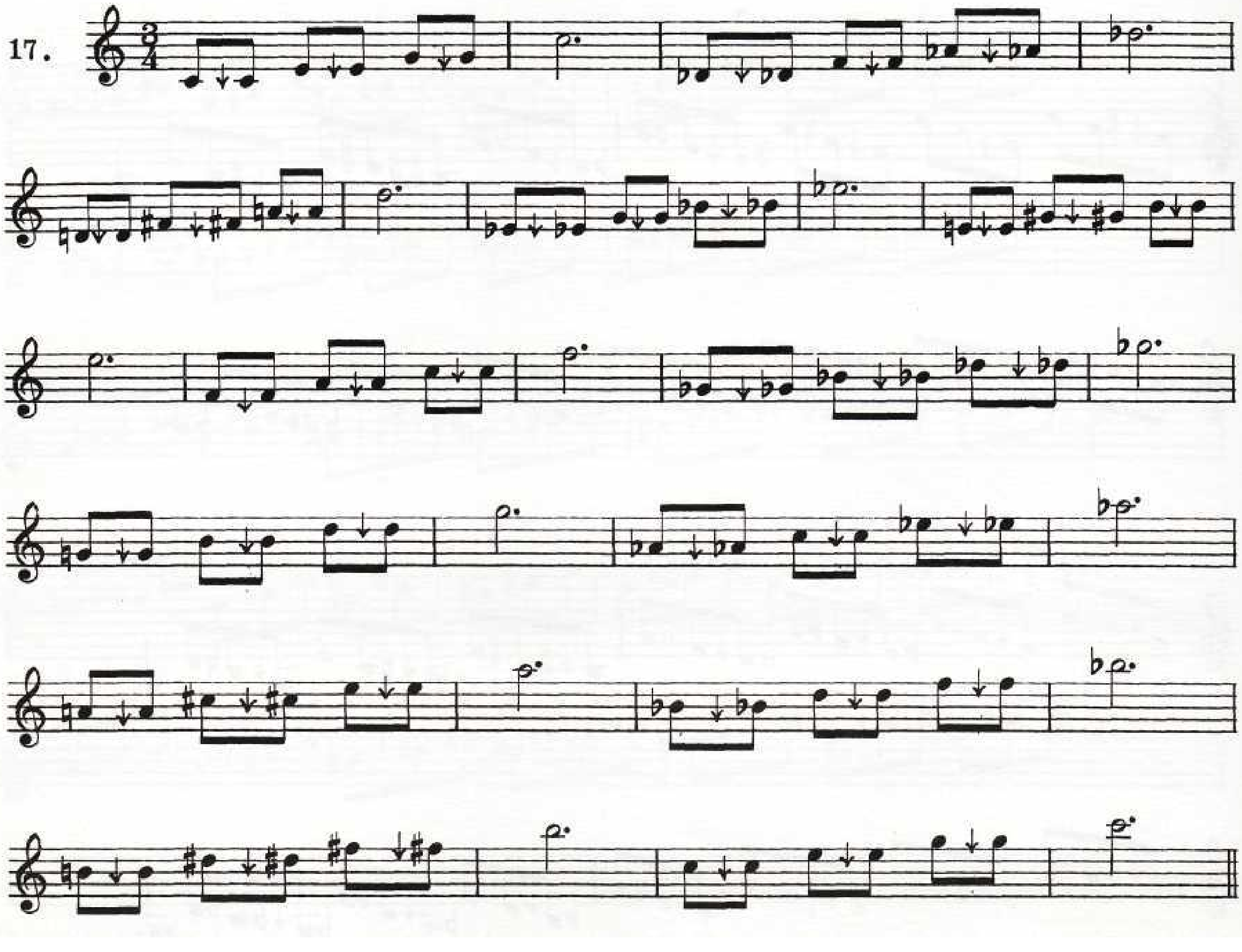

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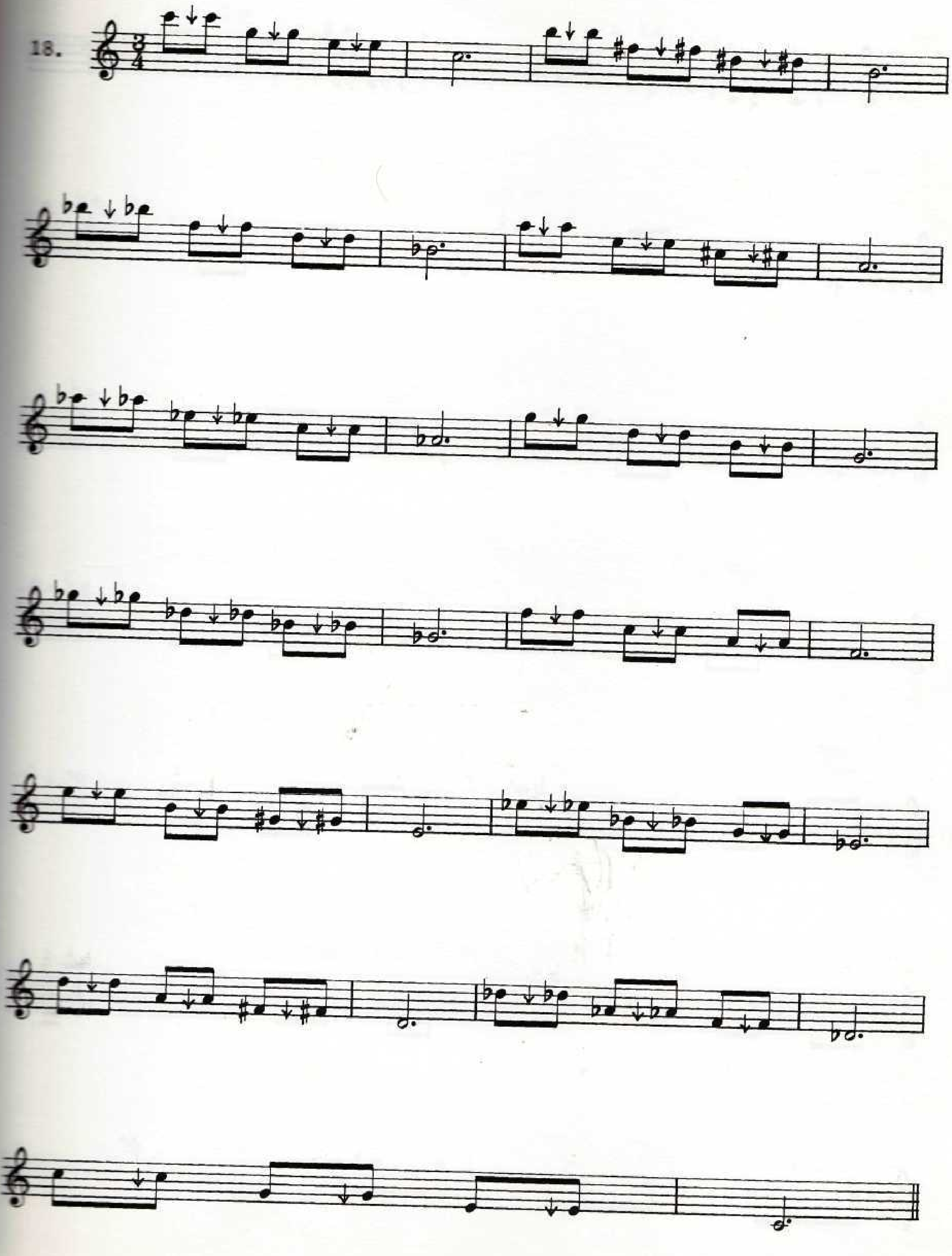

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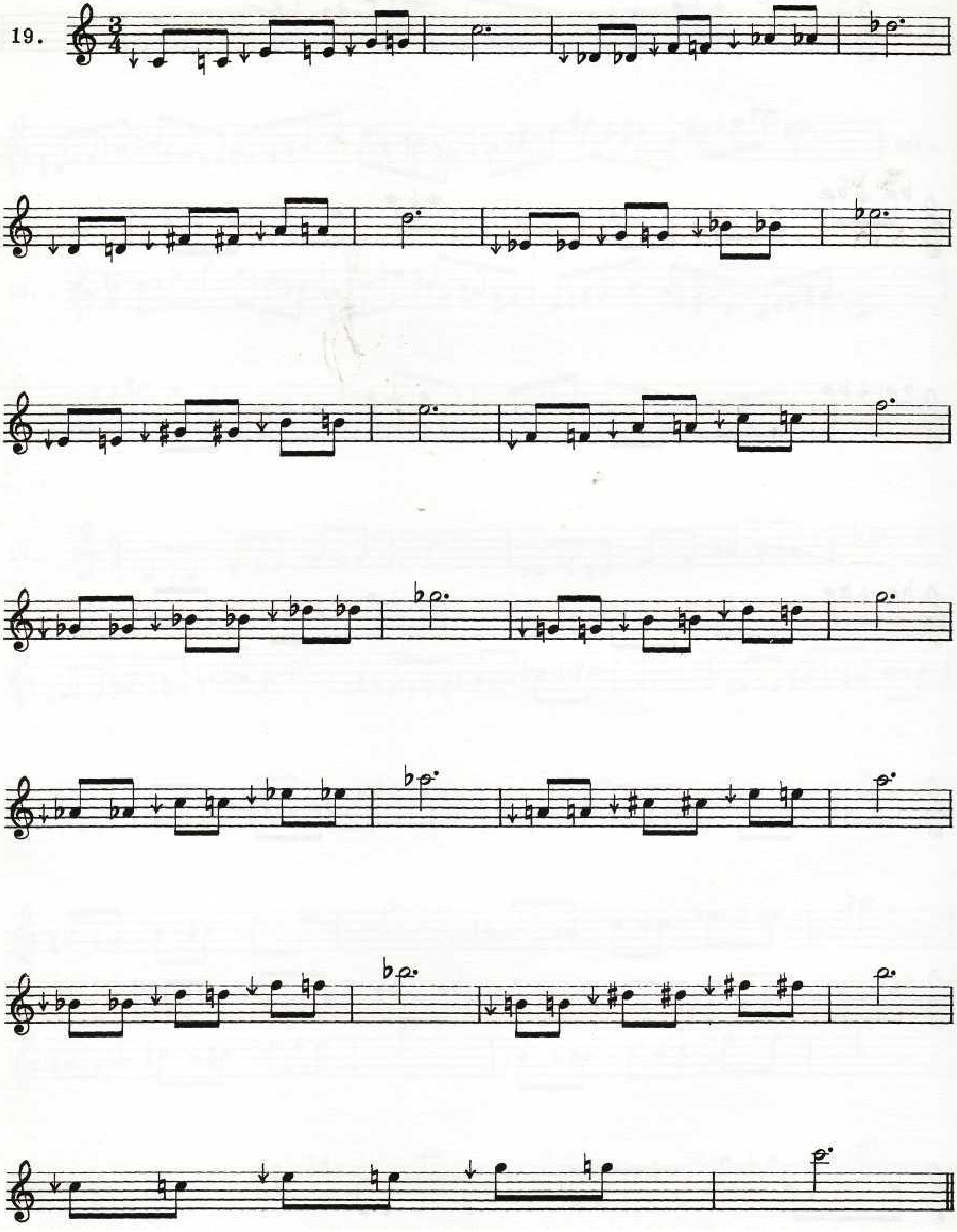

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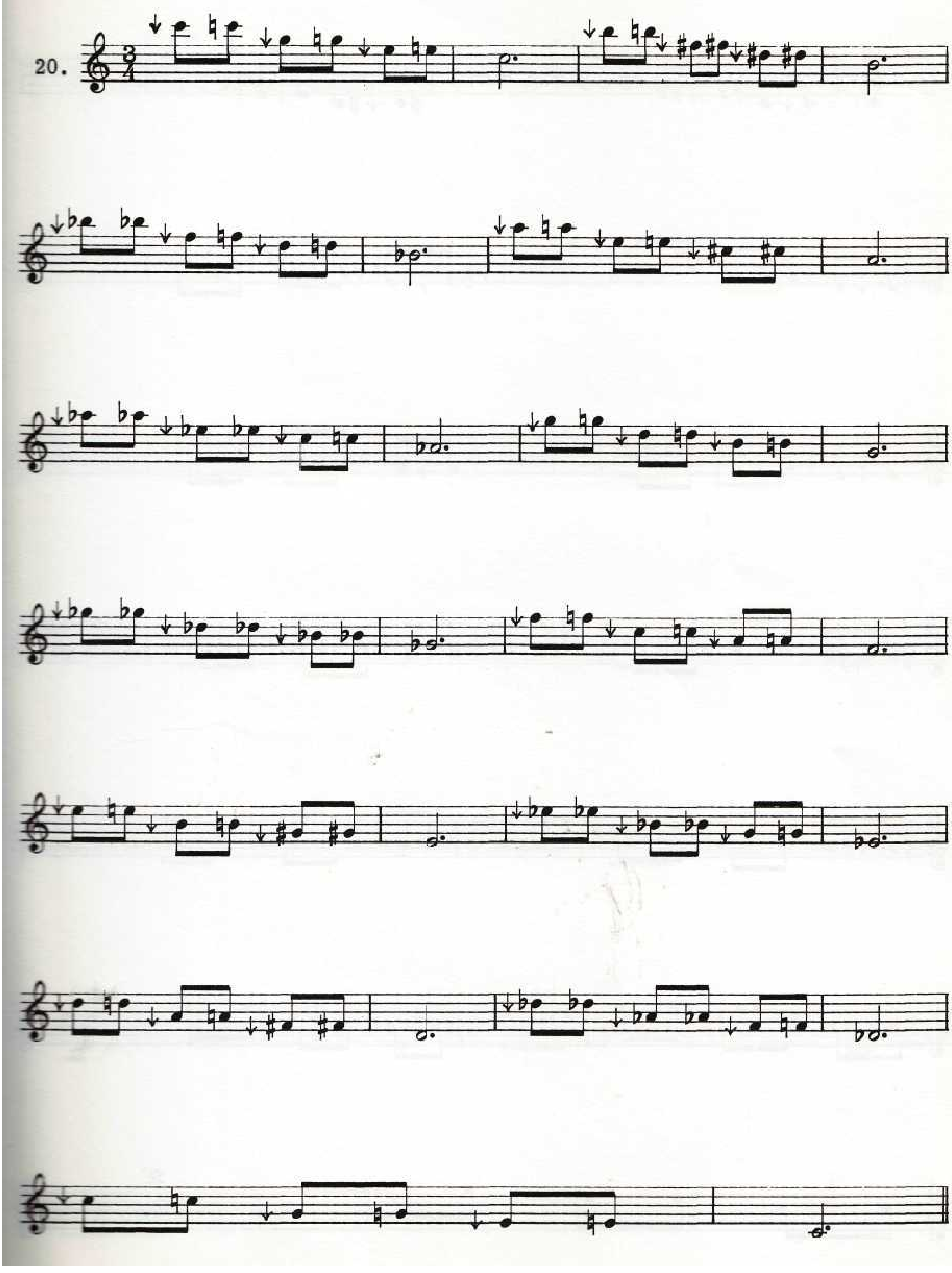

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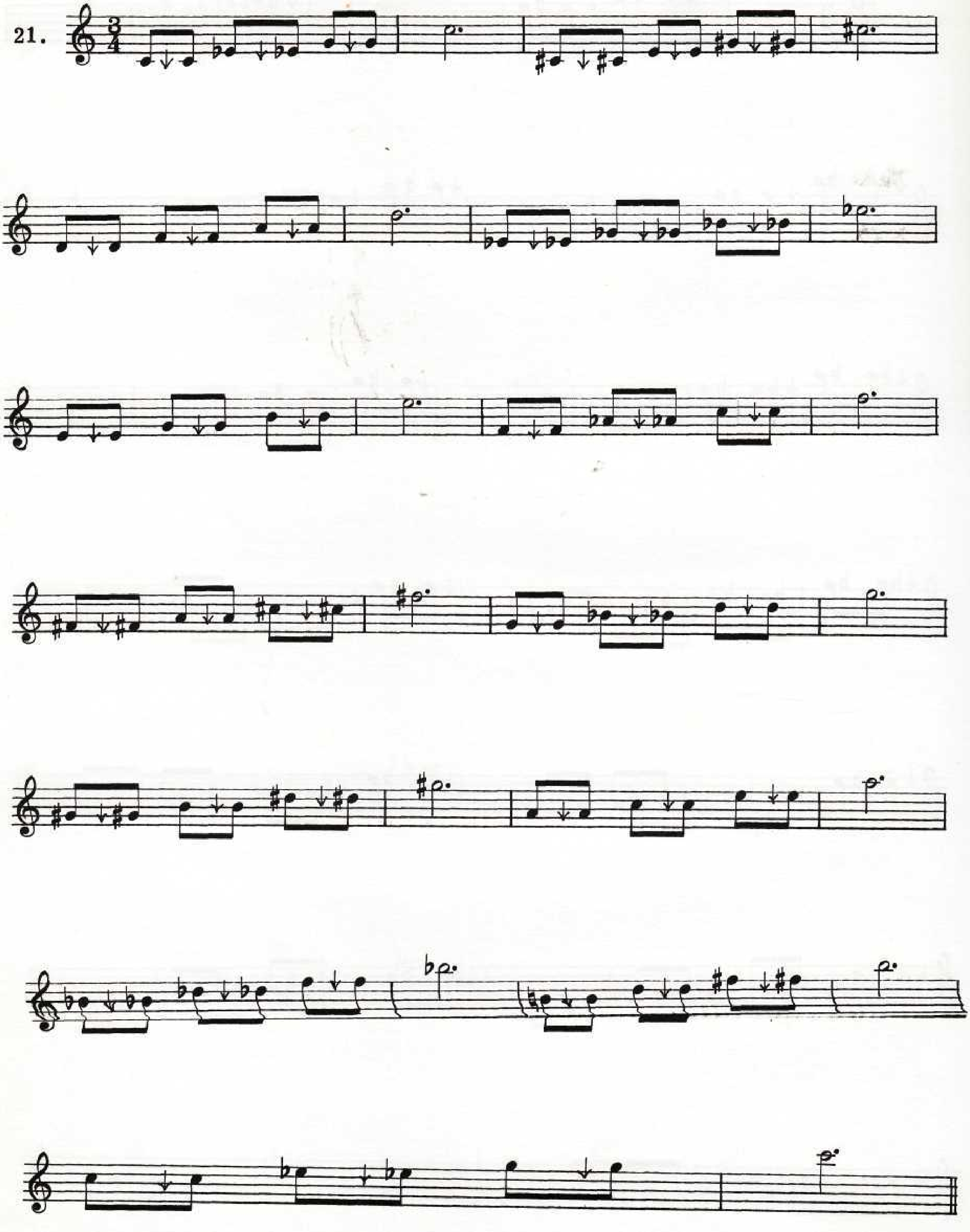

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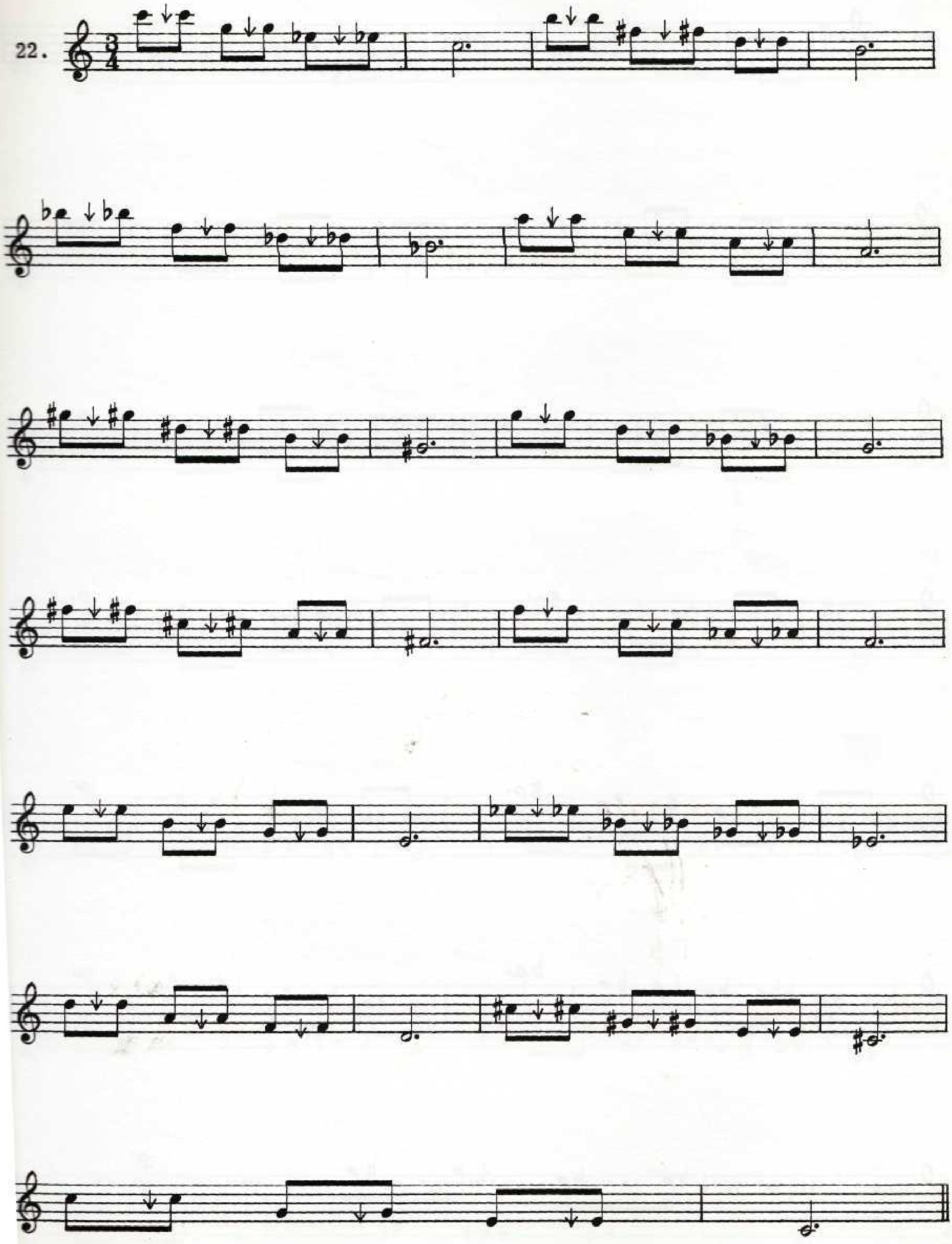

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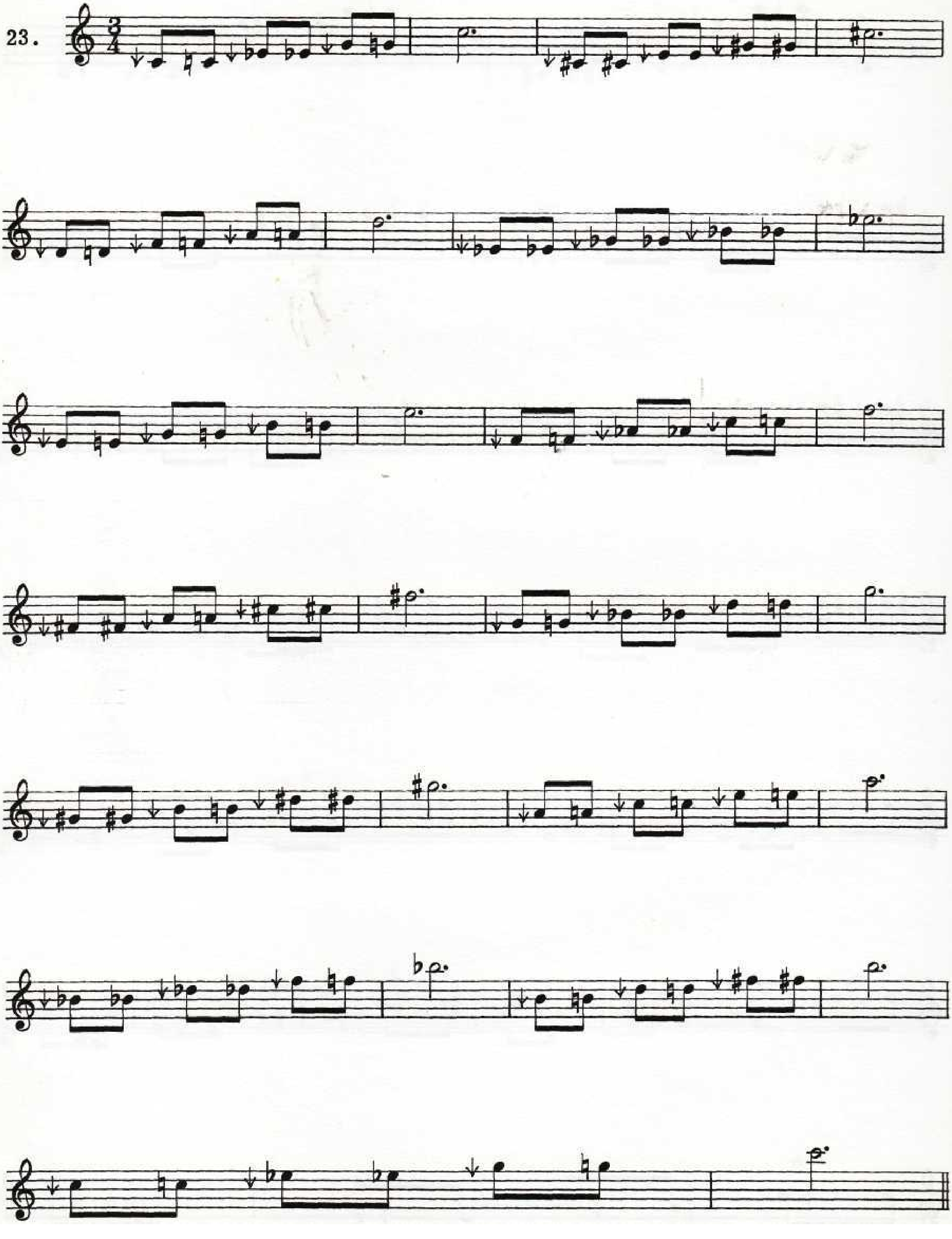

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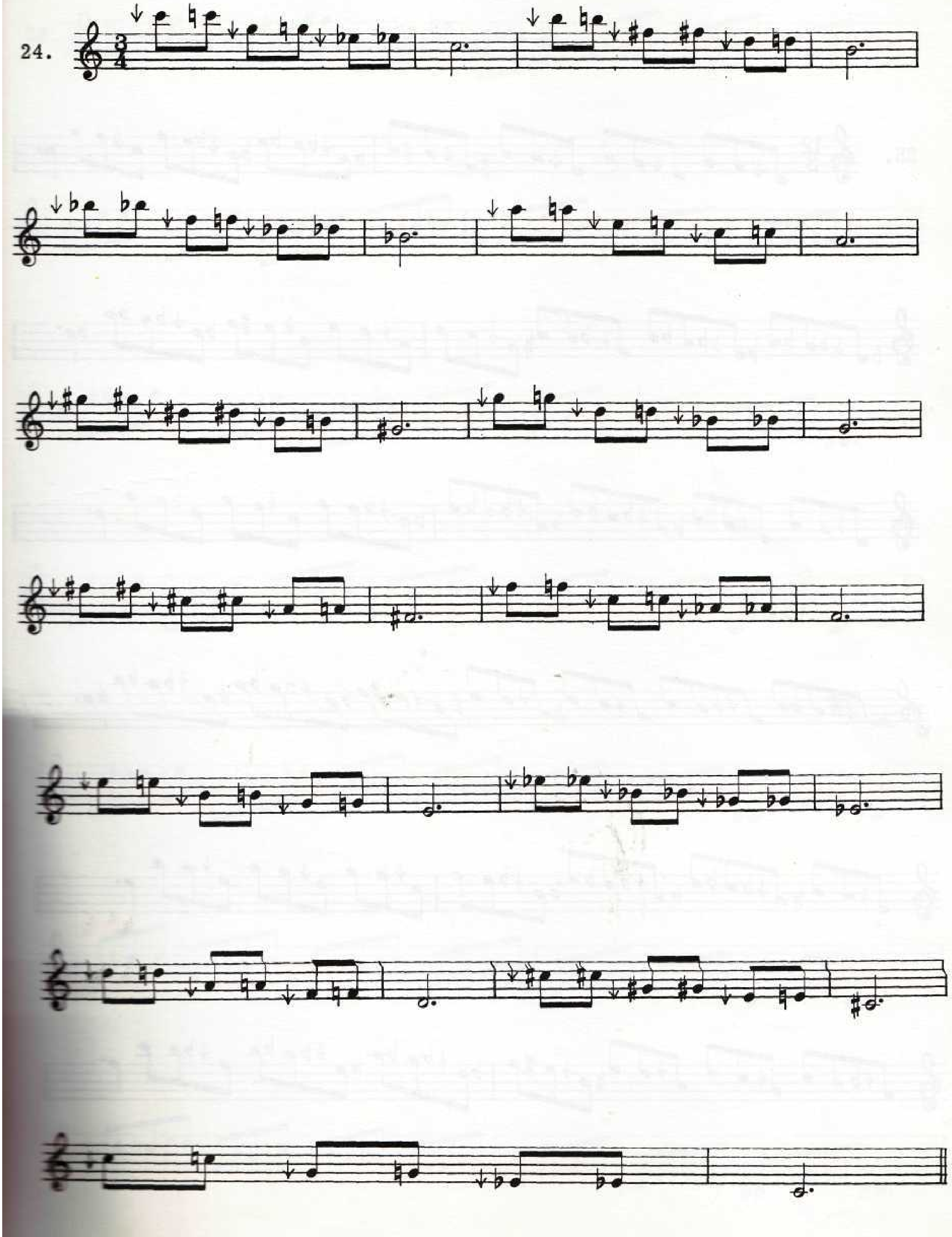

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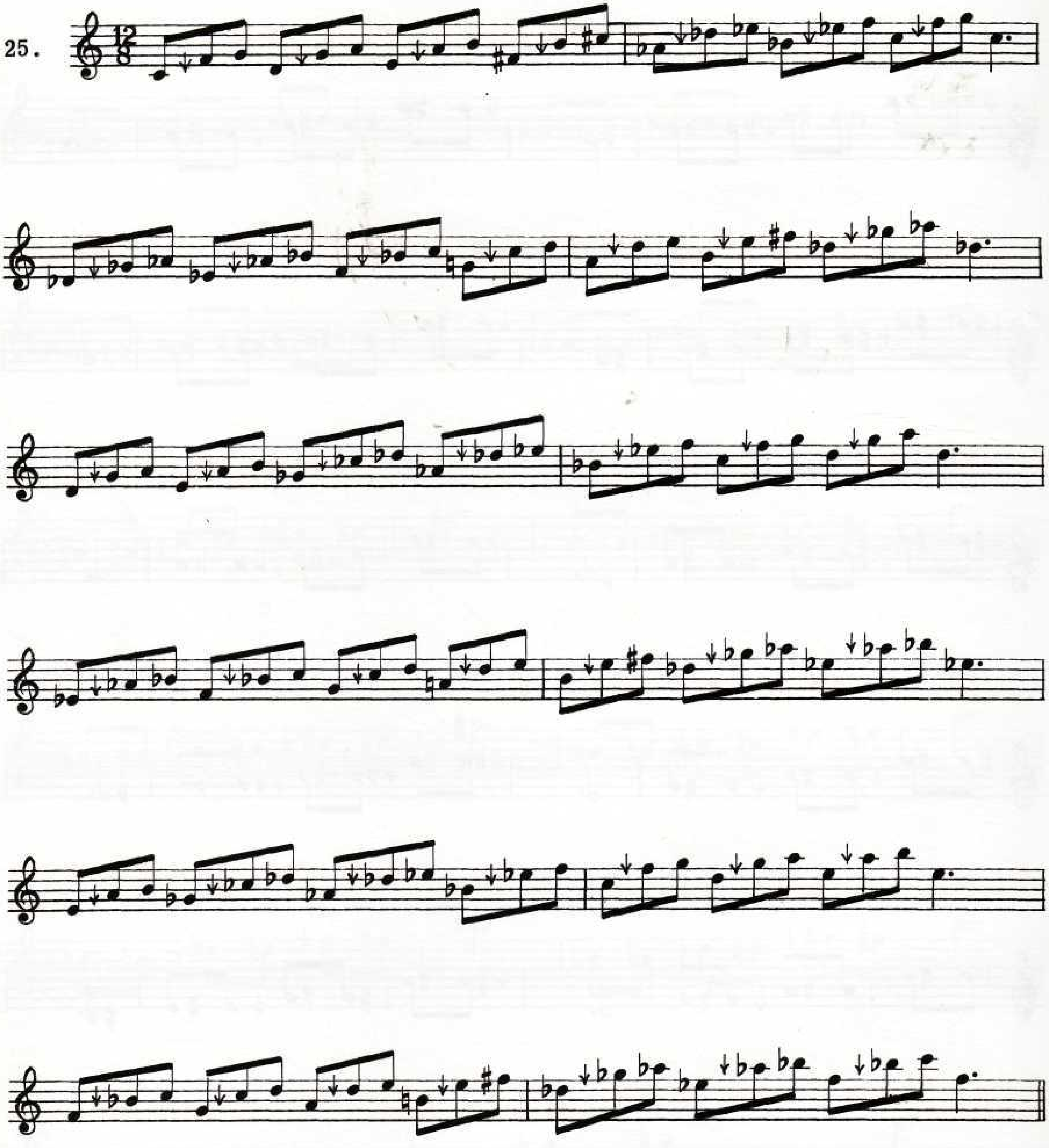

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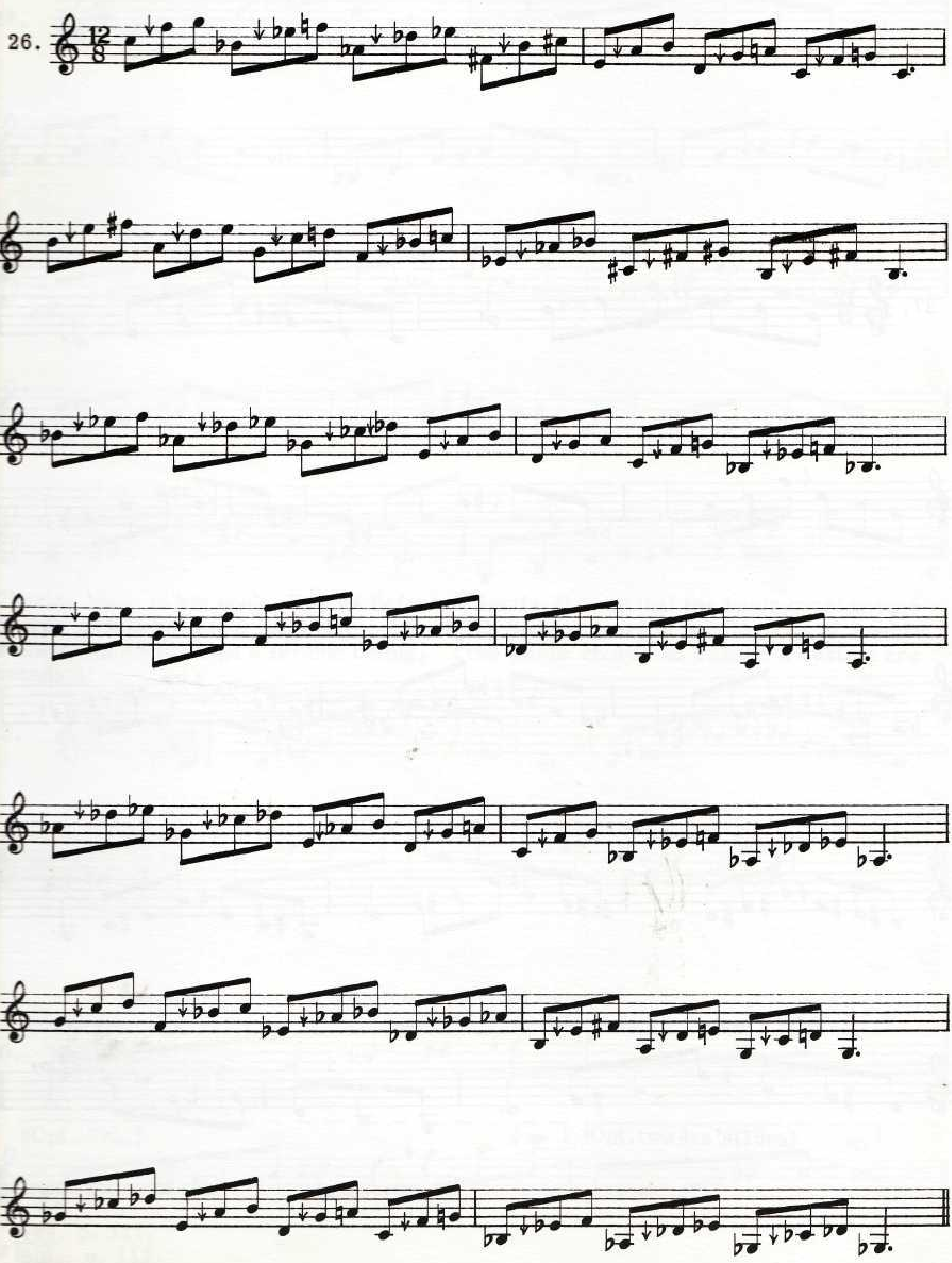

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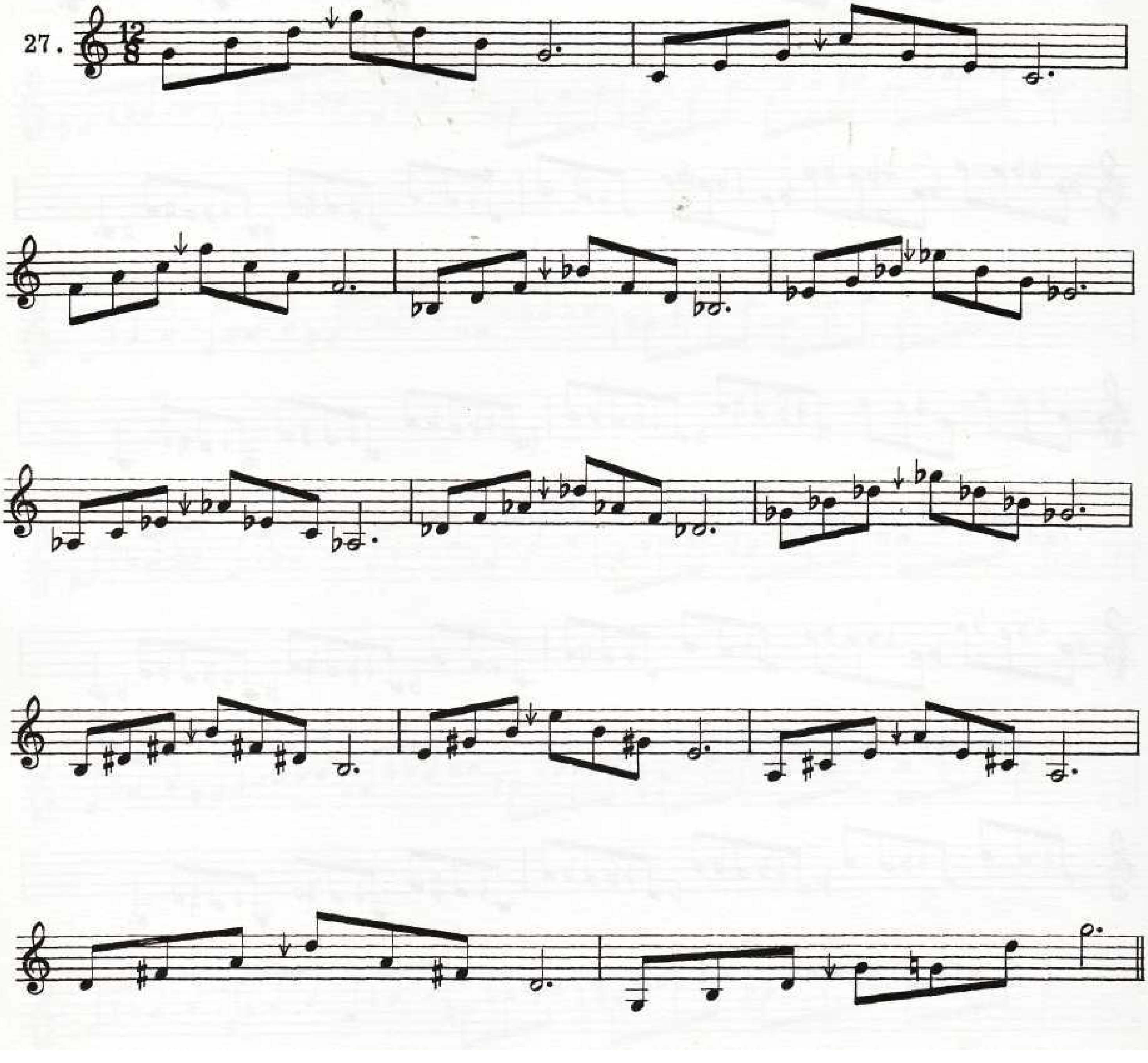

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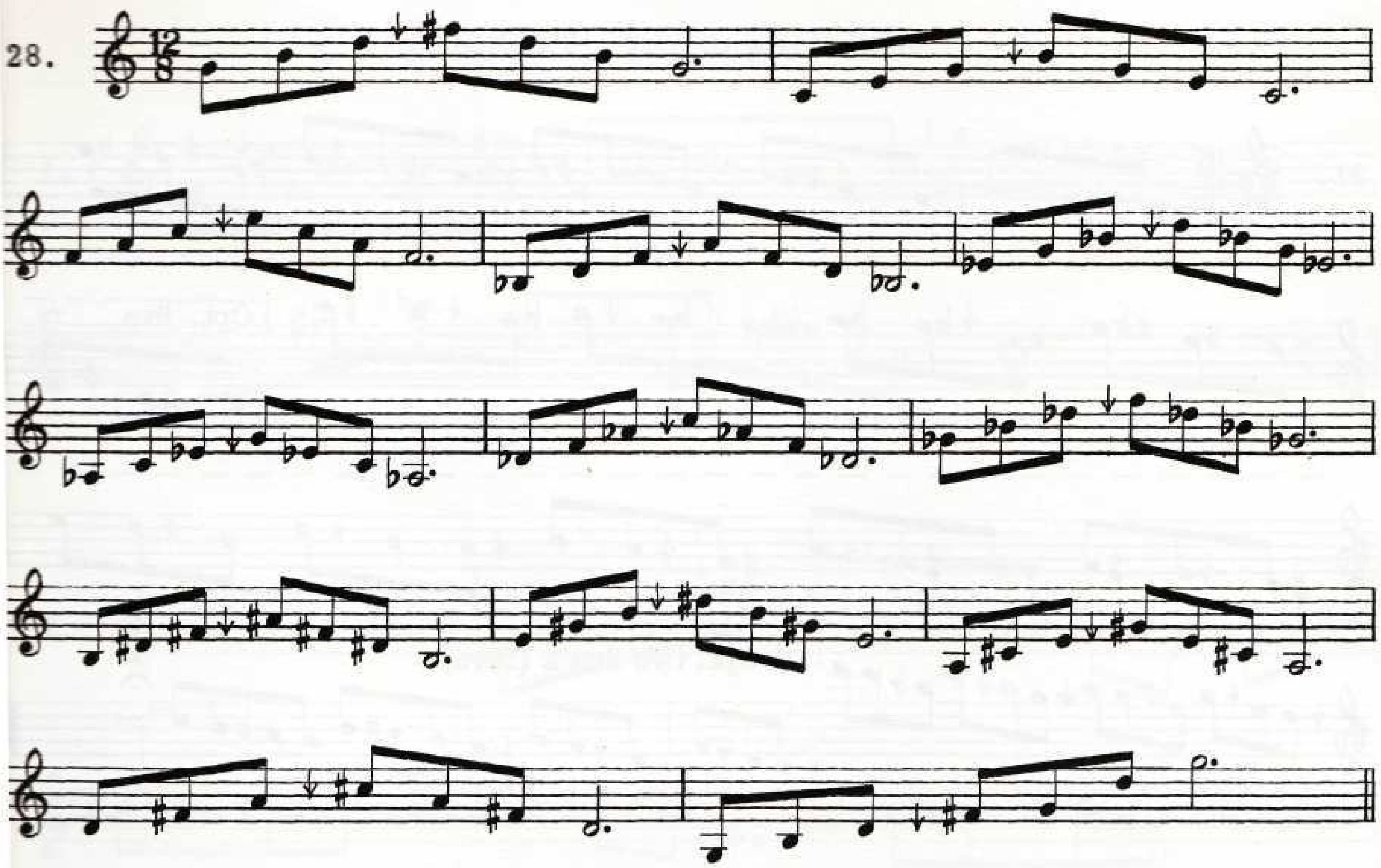
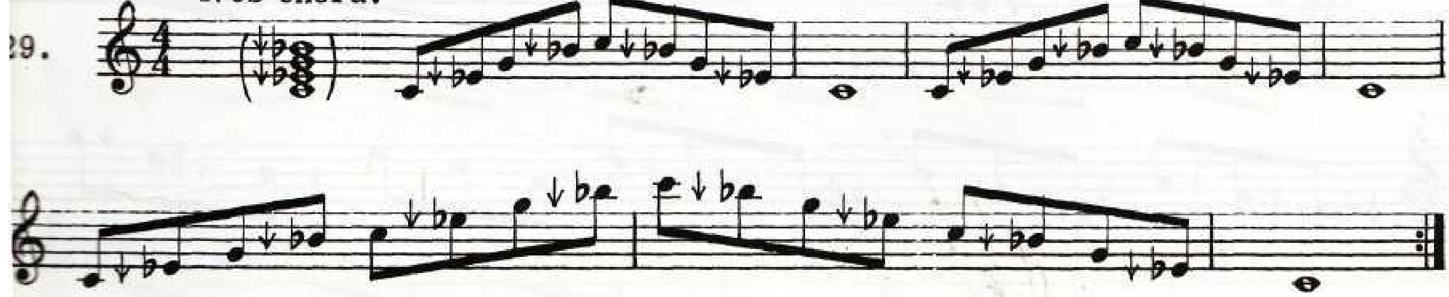


Charles Ives, in his book, Essays Before A Sonata,[27] feels that the basic quarter tone chords should have four or more notes which finds support in the theories of Joseph Yasser, an advocate of a 19-tone tuning. (The basic chords of Yasser's system are hexads.)

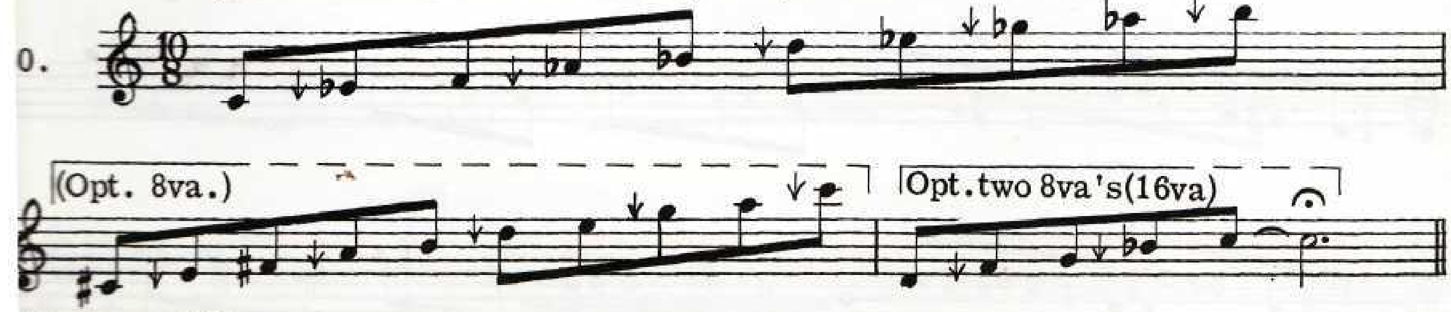
Ives chord.[28]

29.



Symmetrical chord with five equal 1/4 tones.[29]

0.



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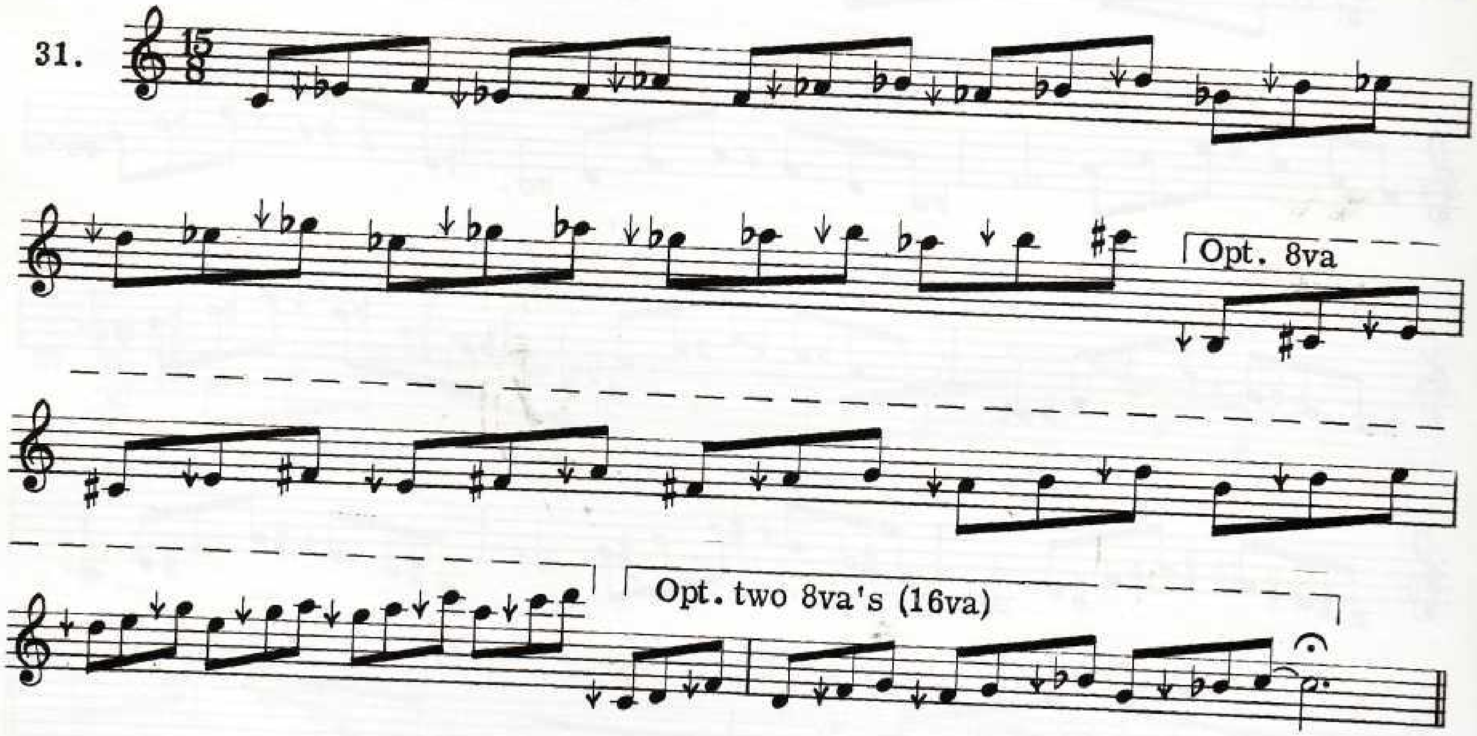
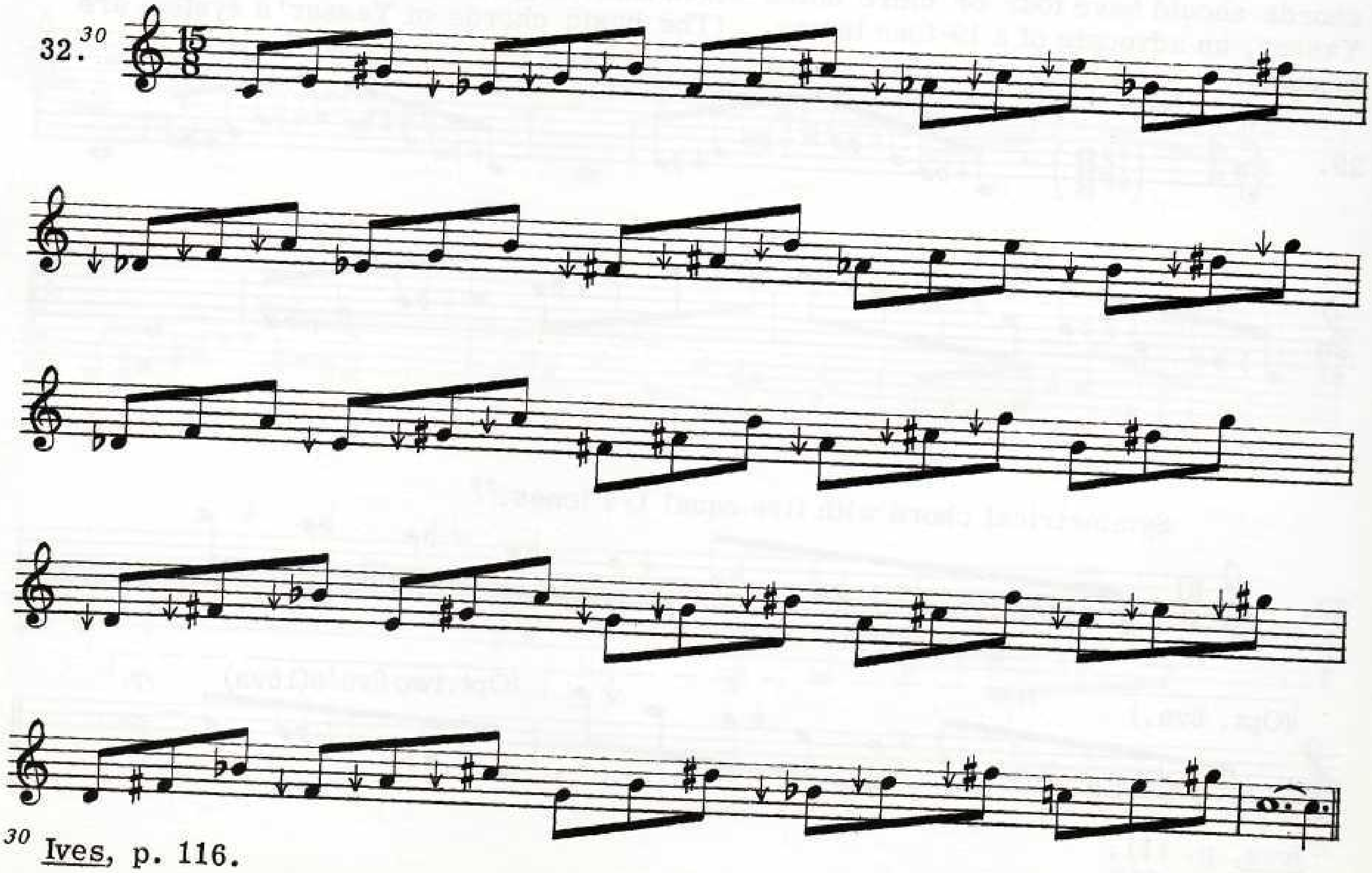
[7] Ives, p. 111.
[8] Ibid., p. 112.
[9] Ibid., p. 113.

31.



32.[30]



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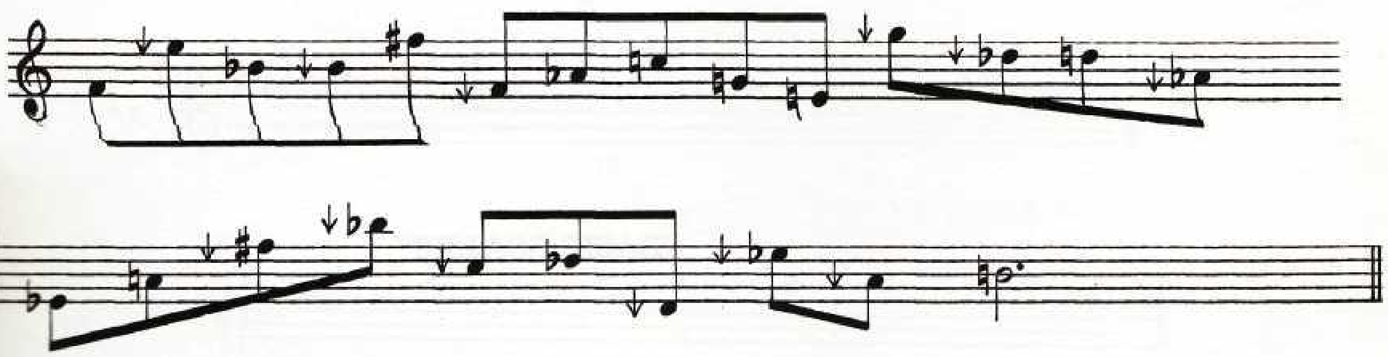
[30] Ives, p. 116.

RANDOM INTERVAL EXERCISES

1.



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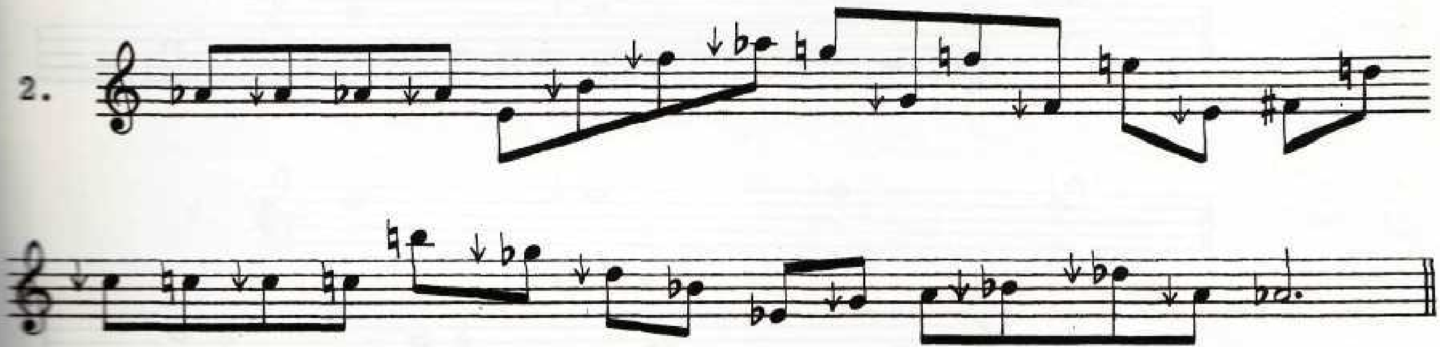

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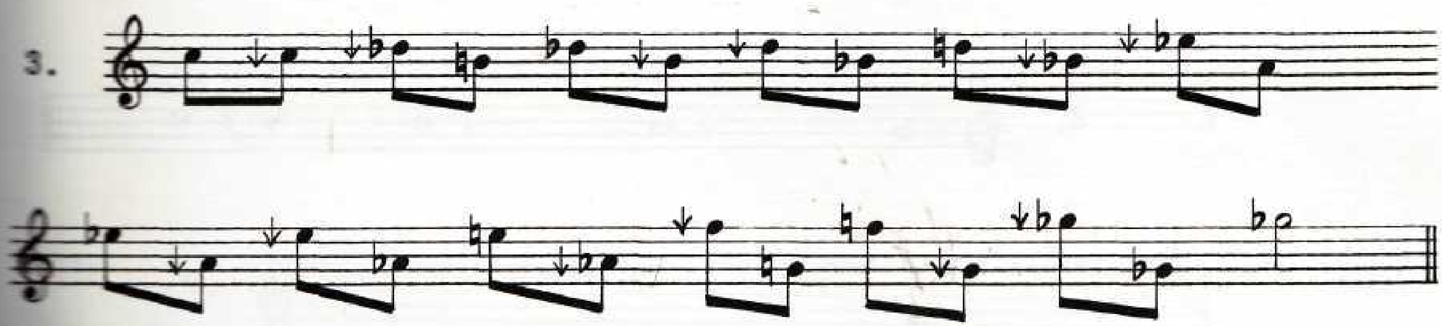

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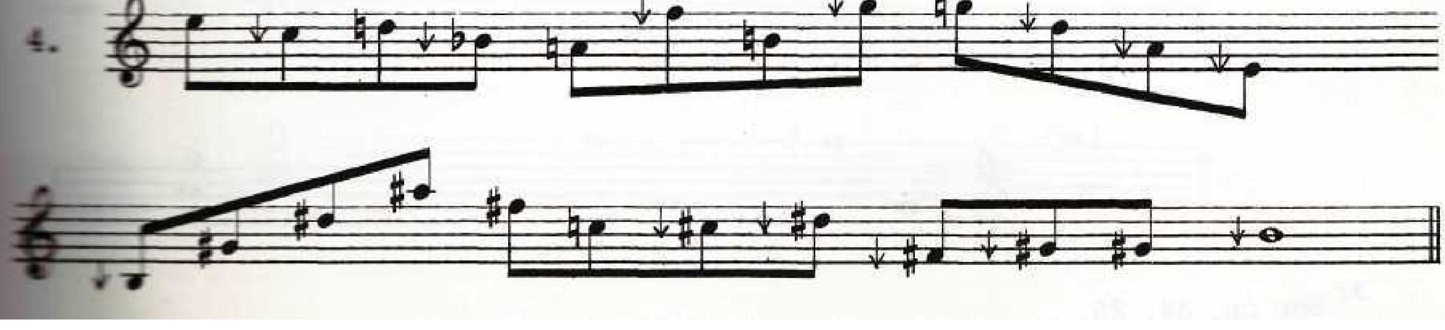
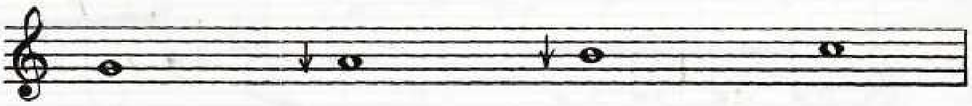


"BASIC SCALES"[31]

A.

1.



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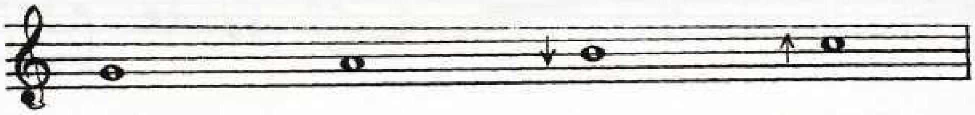

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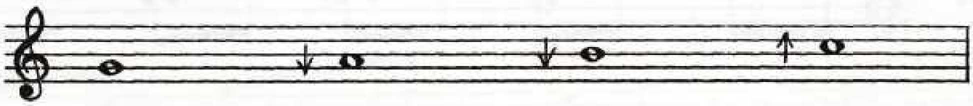

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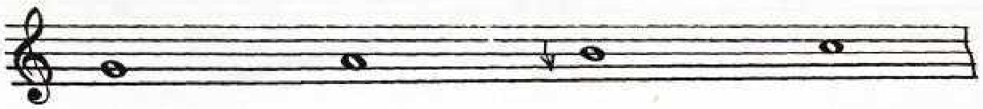
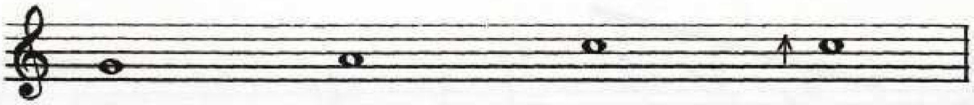


5.



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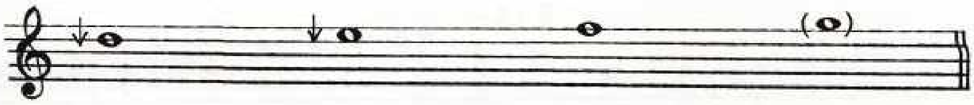
[31] See pp. 34, 35.

B.

1.



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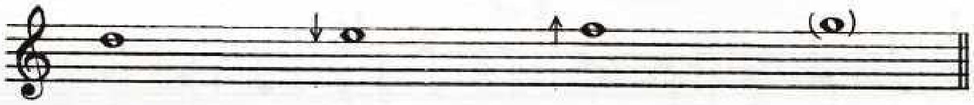

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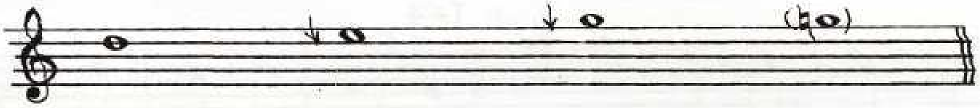

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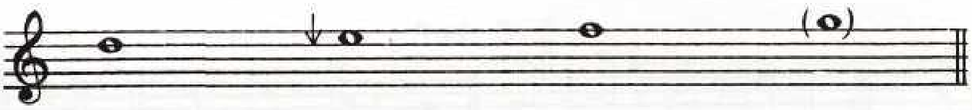

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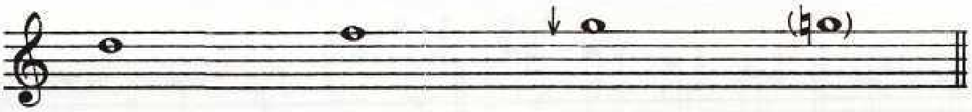

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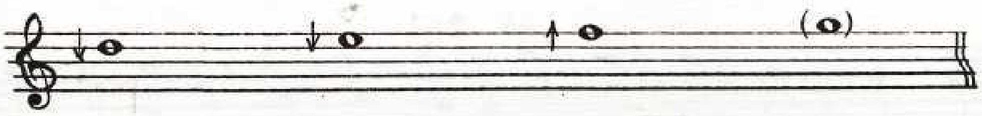

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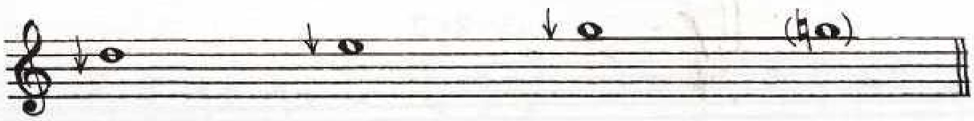

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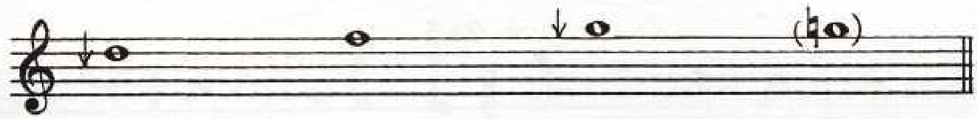

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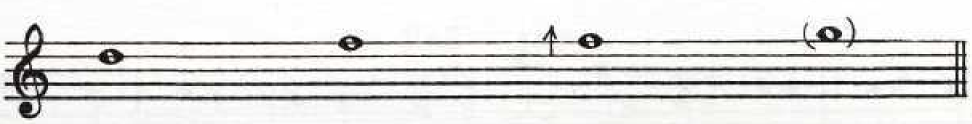
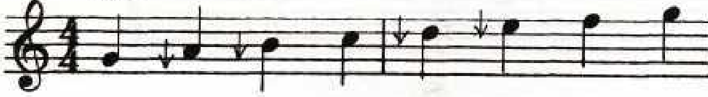


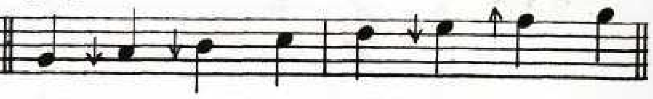
"BASIC SCALE" COMBINATIONS

Combination of A and B.

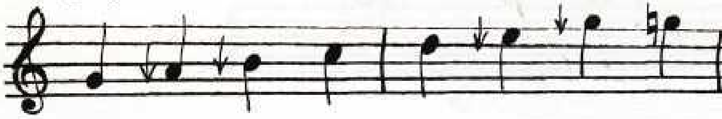
1+1



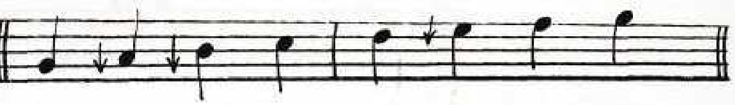
1+2



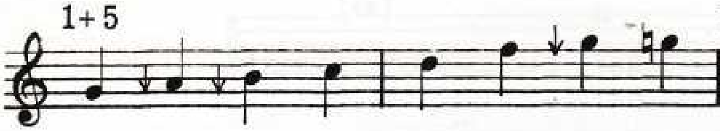
1+3



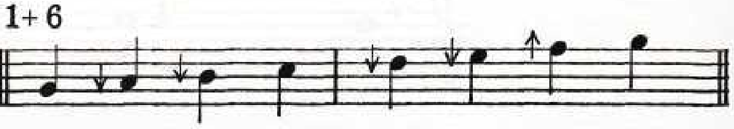
1+4



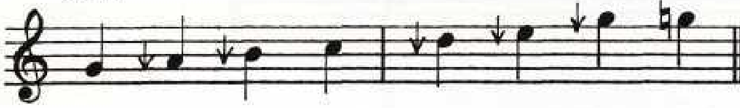
1+5



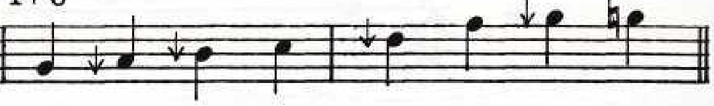
1+6



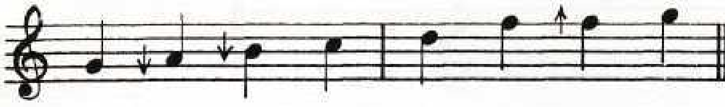
1+7



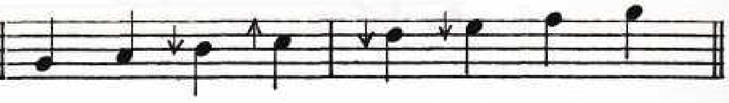
1+8



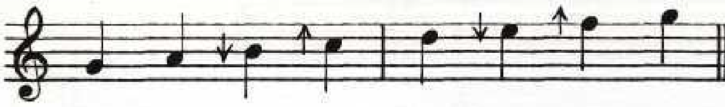
1+9



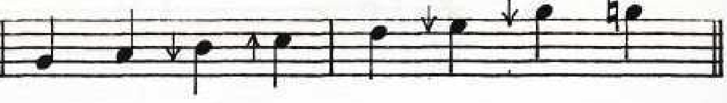
2+1



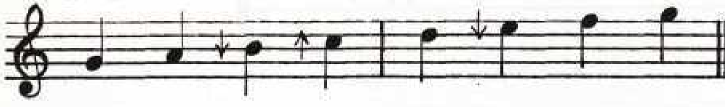
2+2



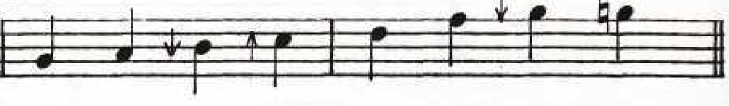
2+3



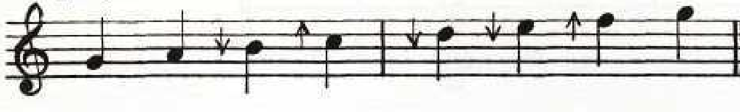
2+4



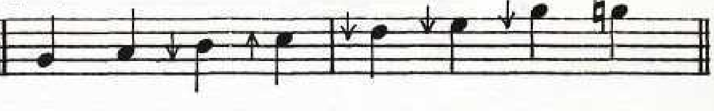
2+5



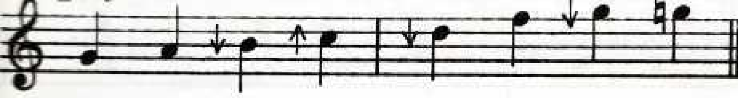
2+6



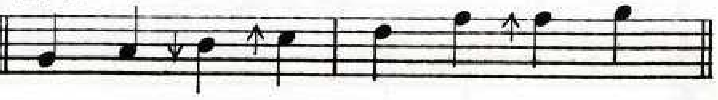
2+7



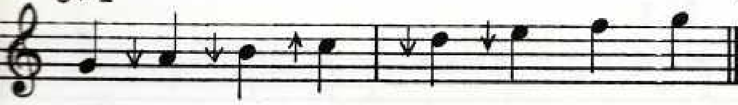
2+ 8



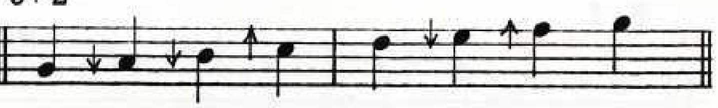
2+ 9



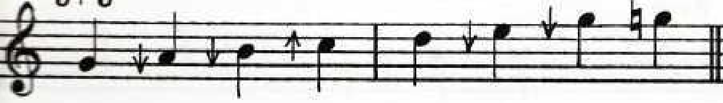
3+ 1



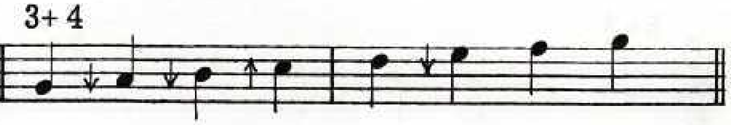
3+ 2



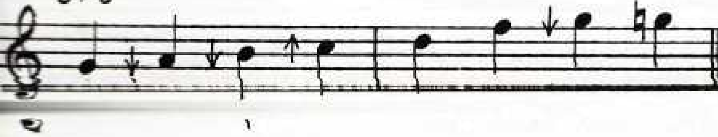
3+ 3



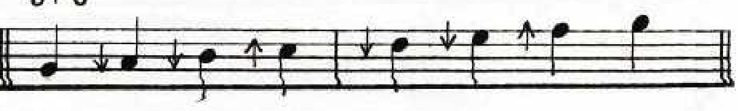
3+ 4



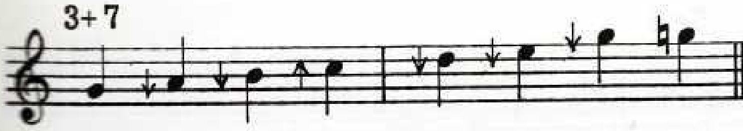
3+ 5



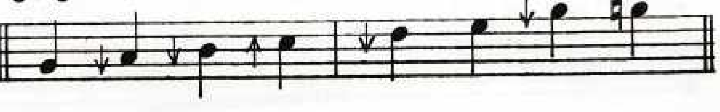
3+ 6



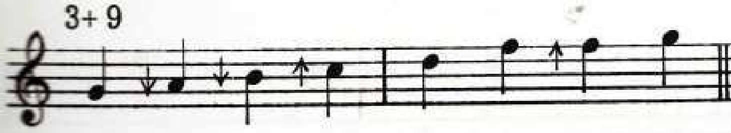
3+ 7



3+ 8



3+ 9



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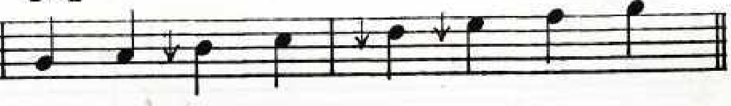

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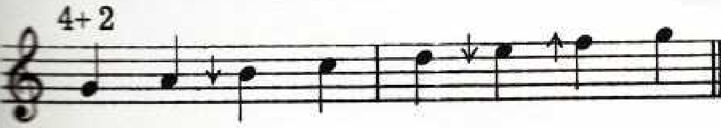

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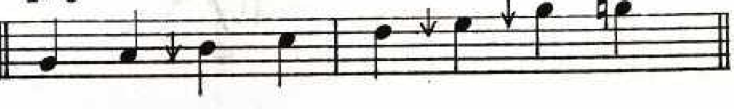
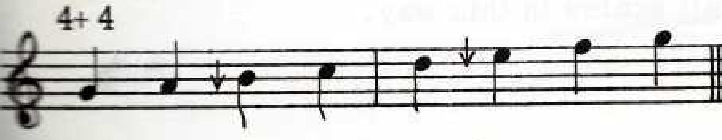


4+ 4



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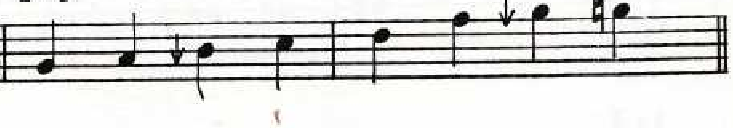
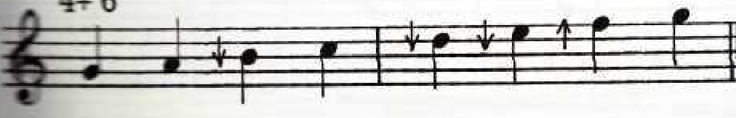
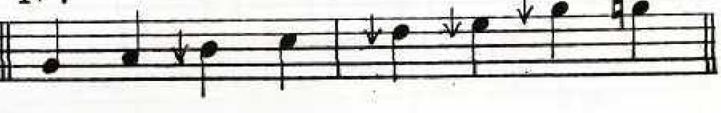


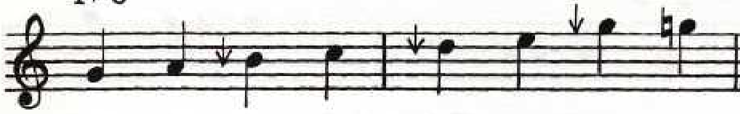
4+ 6



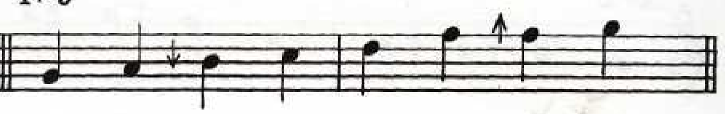
4+ 7



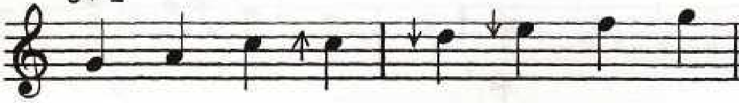
4+ 8



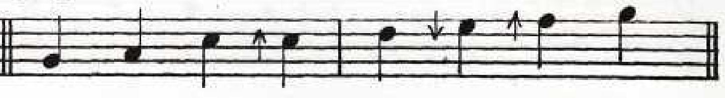
4+ 9



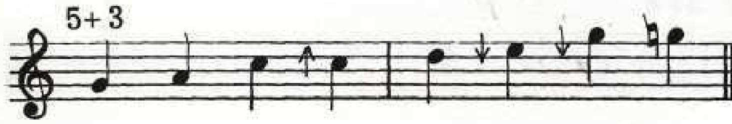
5+ 1



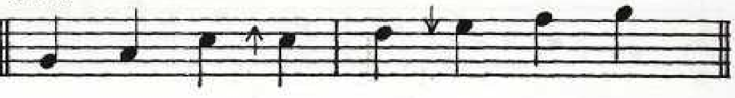
5+ 2



5+ 3



5+ 4



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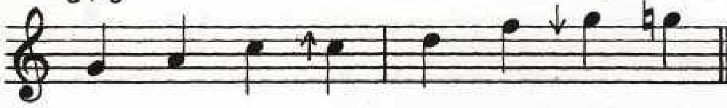
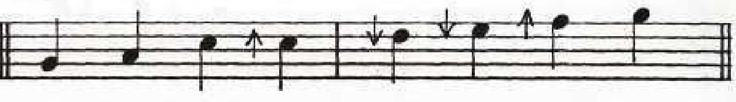
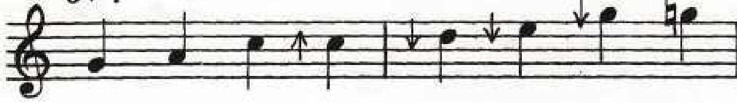


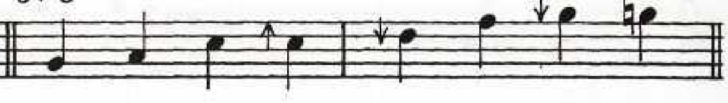
5+ 6



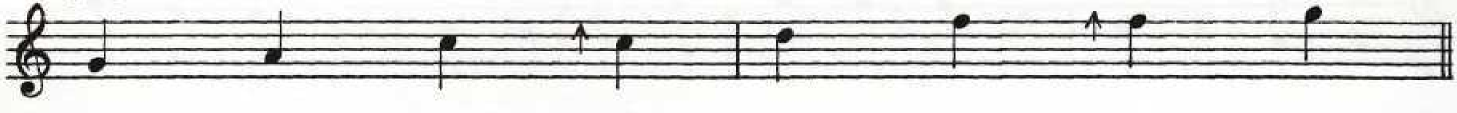
5+ 7



5+ 8



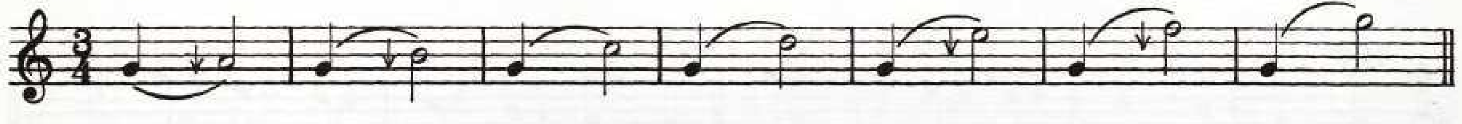
5+ 9



Transpose all scales to all keys. Also play all scales in this way.

1+ 1

etc.

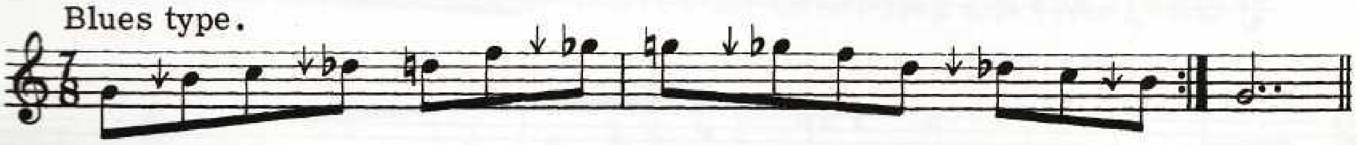


NEW SCALES

The following are examples of some other scale possibilities which I have found most nteresting.

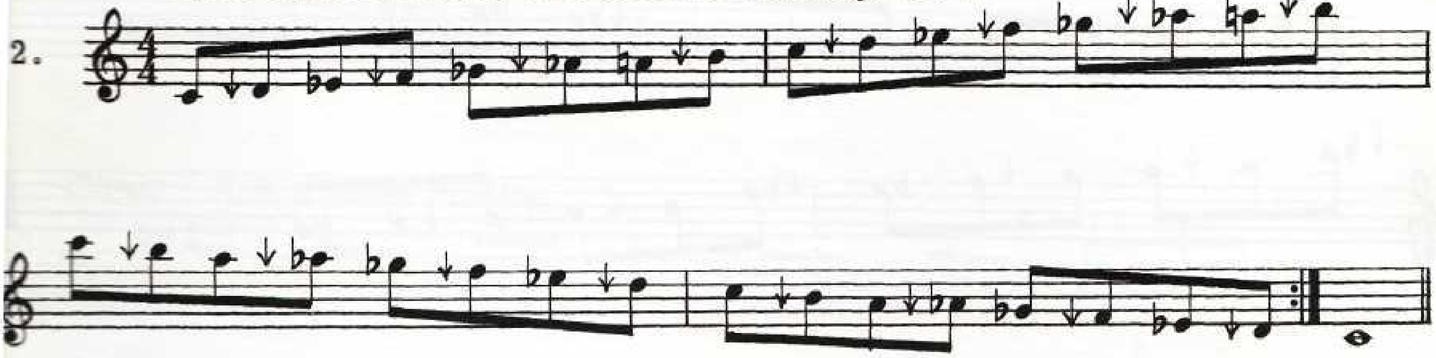
Blues type.

1.

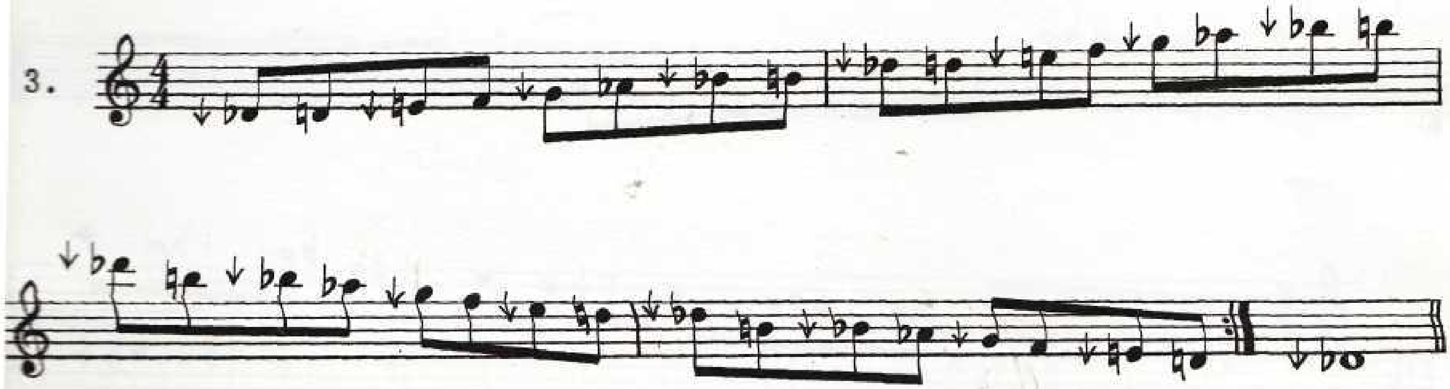


Three equal 1/4 tones (see also no. 30, page 73).

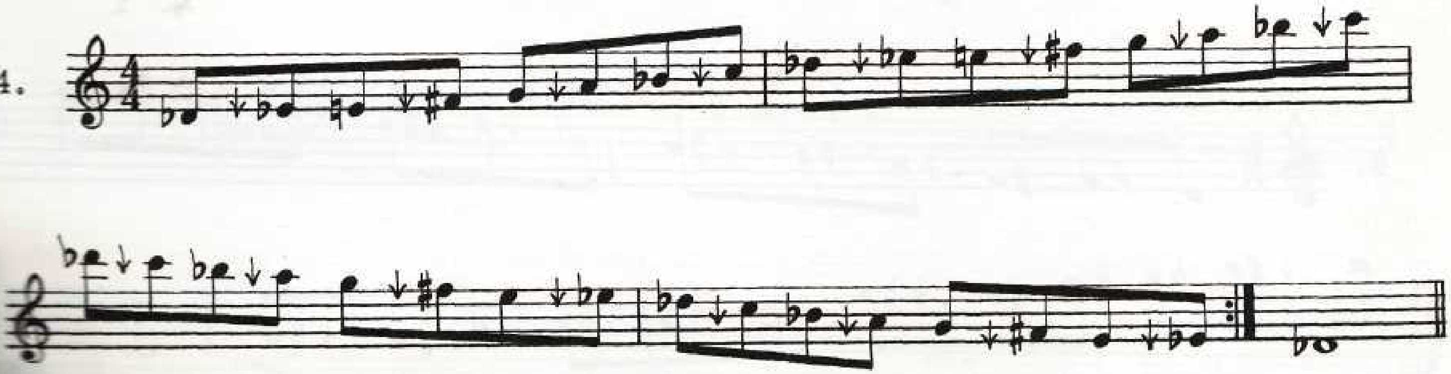
2.



3.

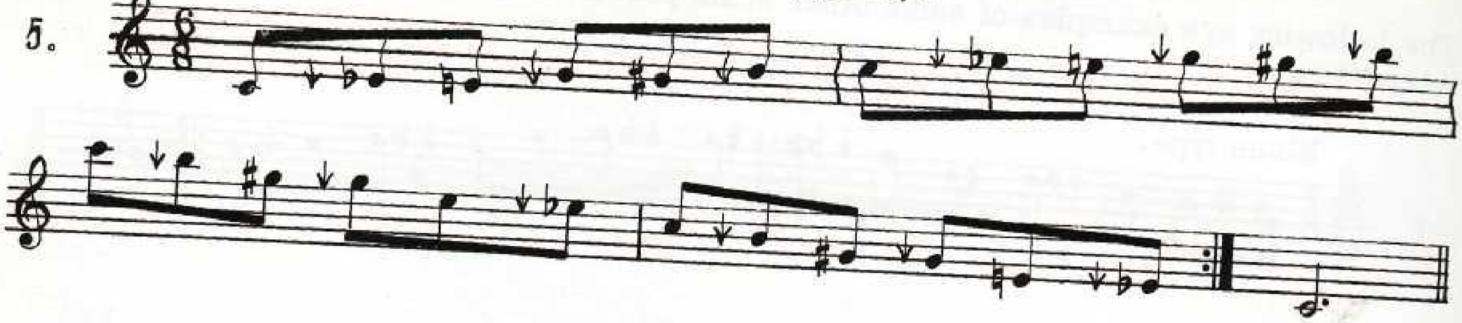


4.



Combination of two chords (see no. 32, p. 74).

5.



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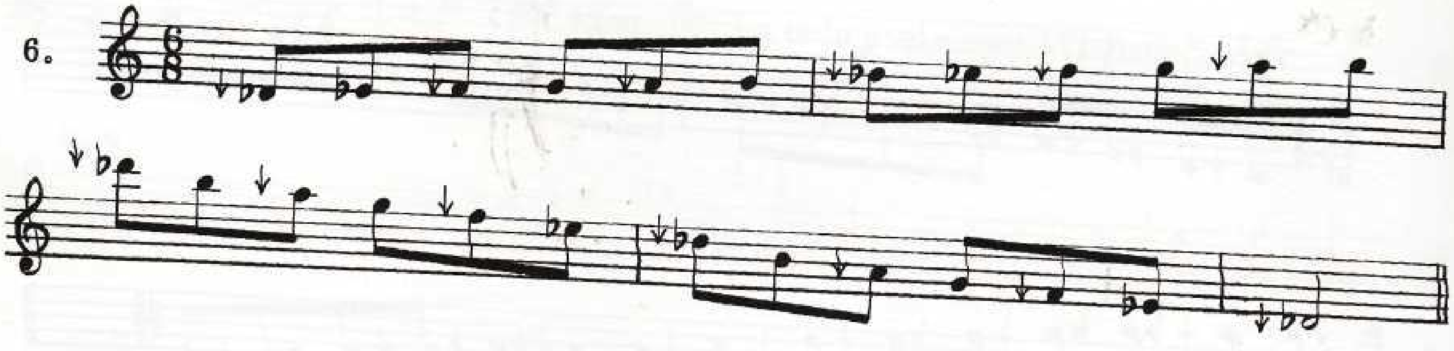

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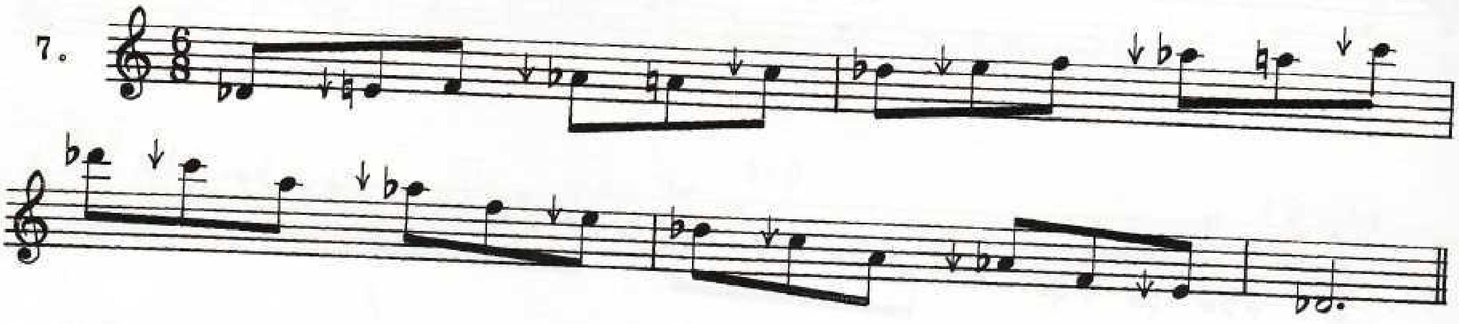
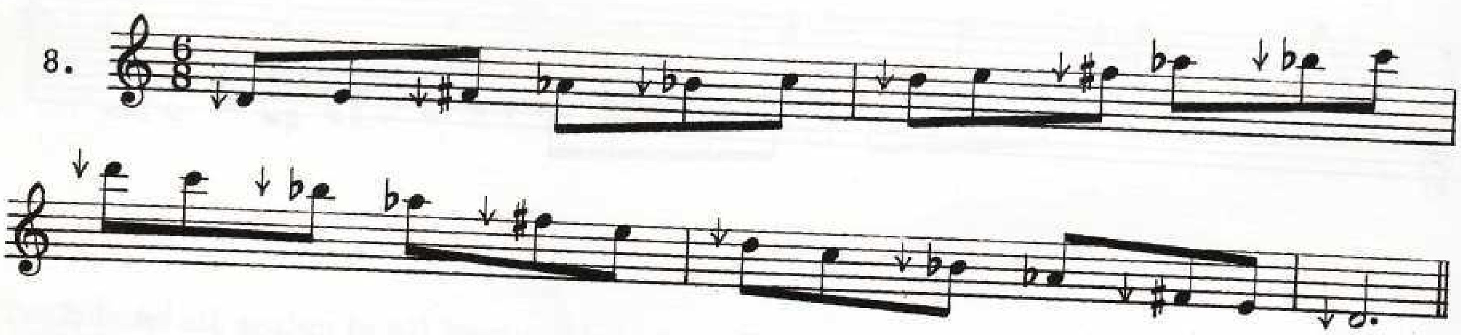


8.



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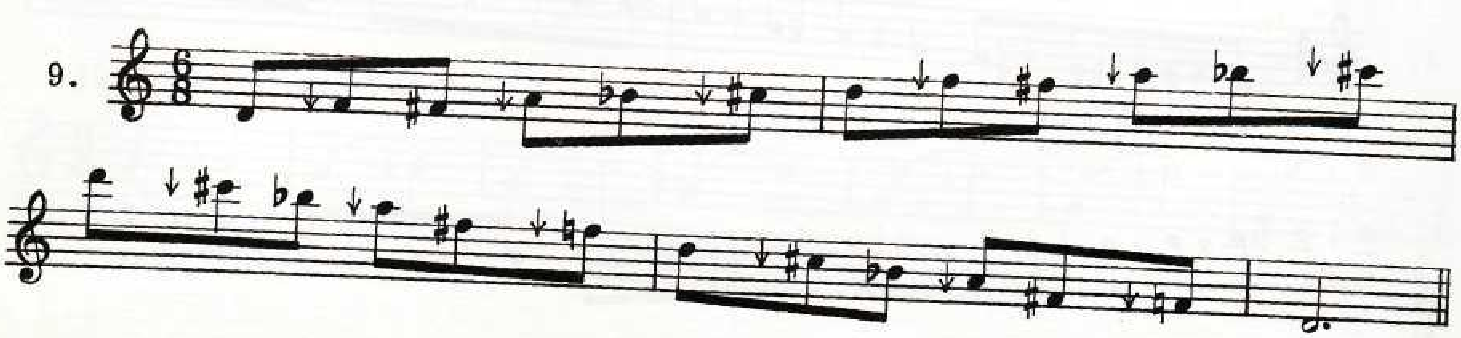
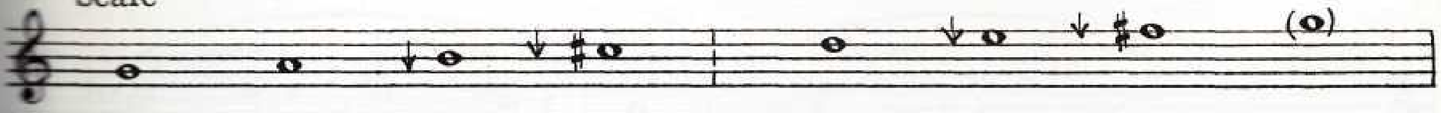


CHAPTER 8

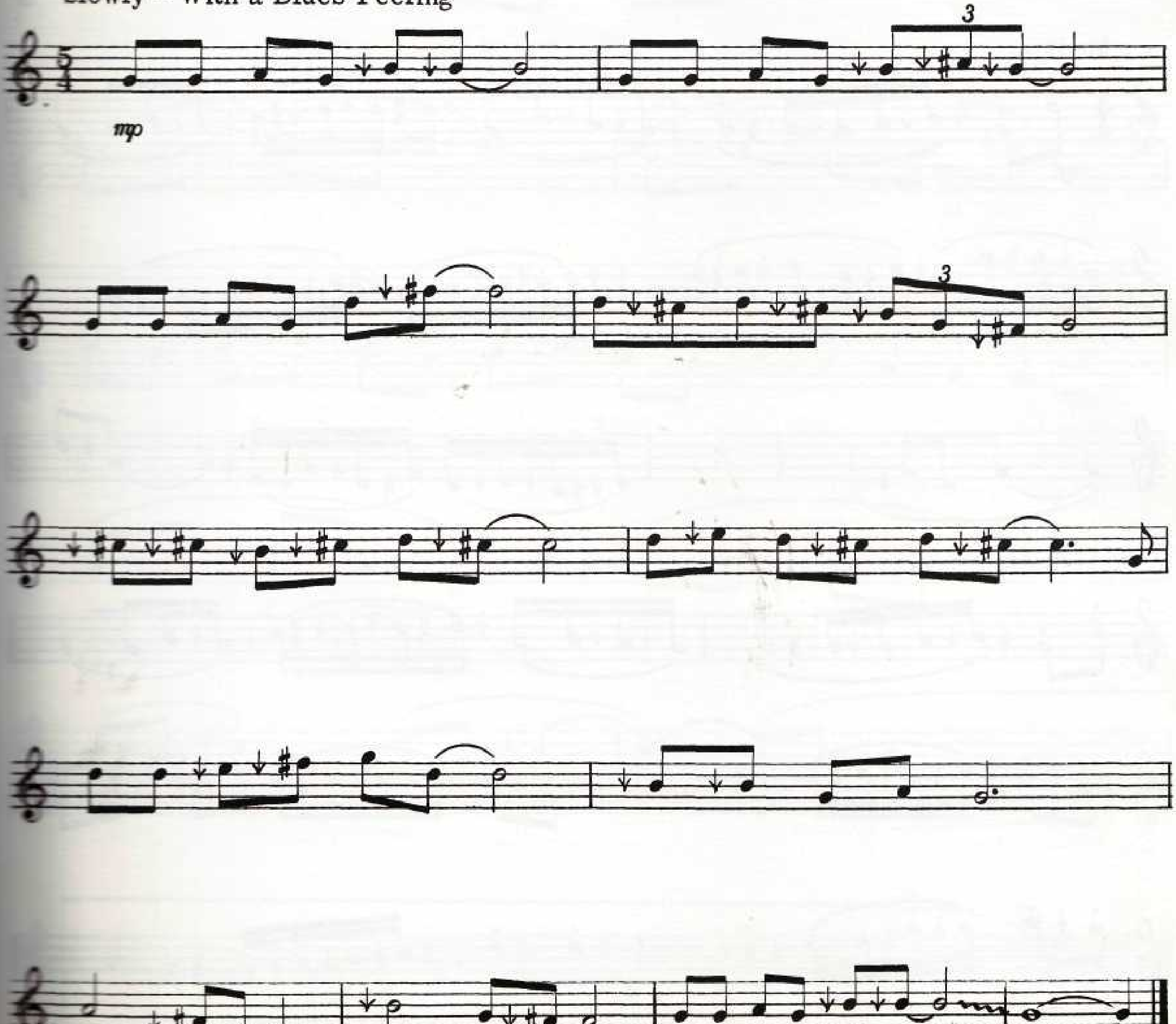
MELODIC STUDIES USING QUARTER TONES

STUDY 1

Scale

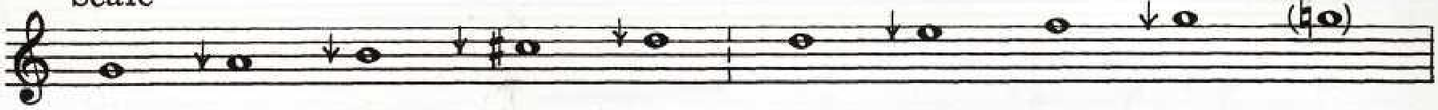


Slowly - With a Blues Feeling

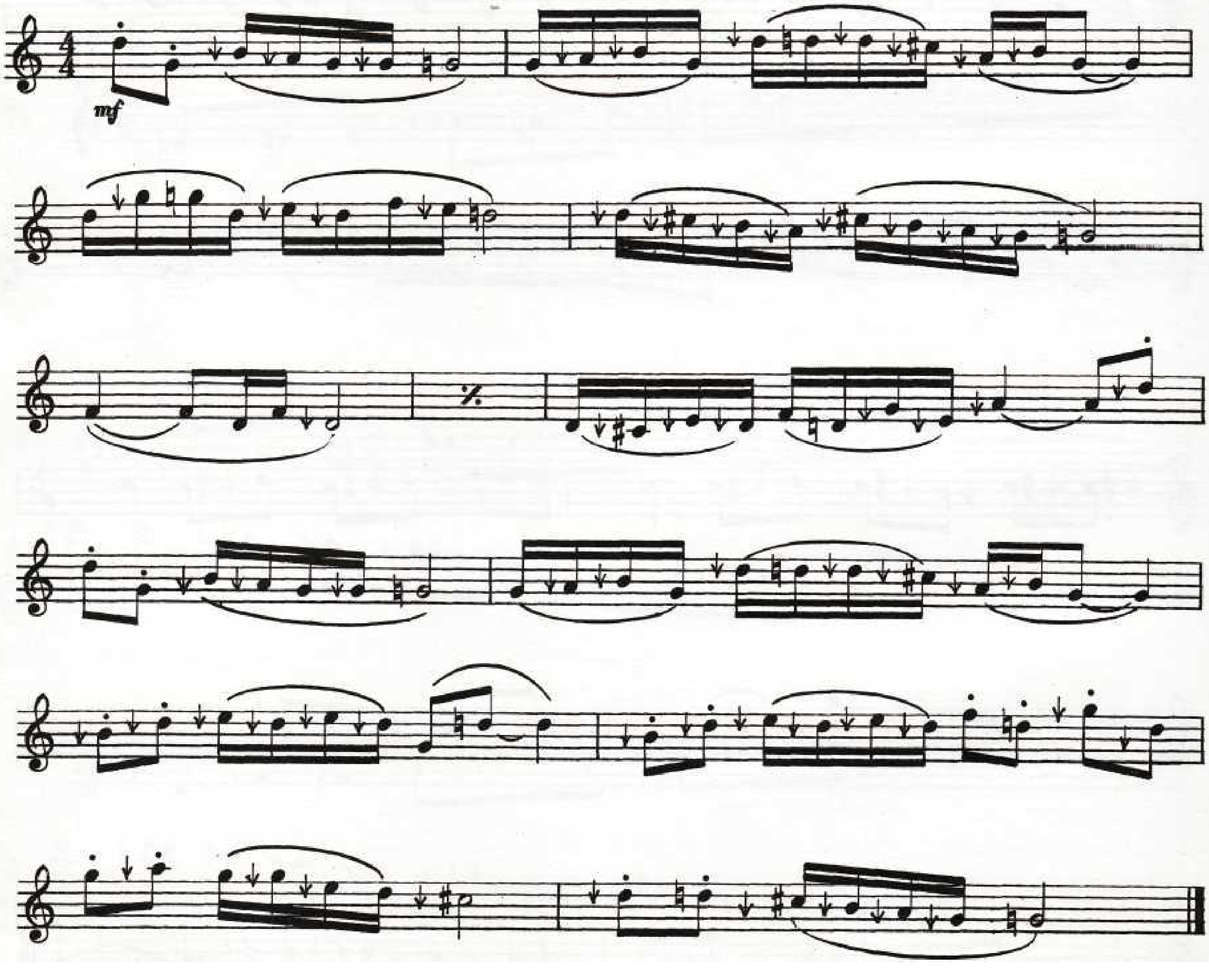


STUDY 2

Scale

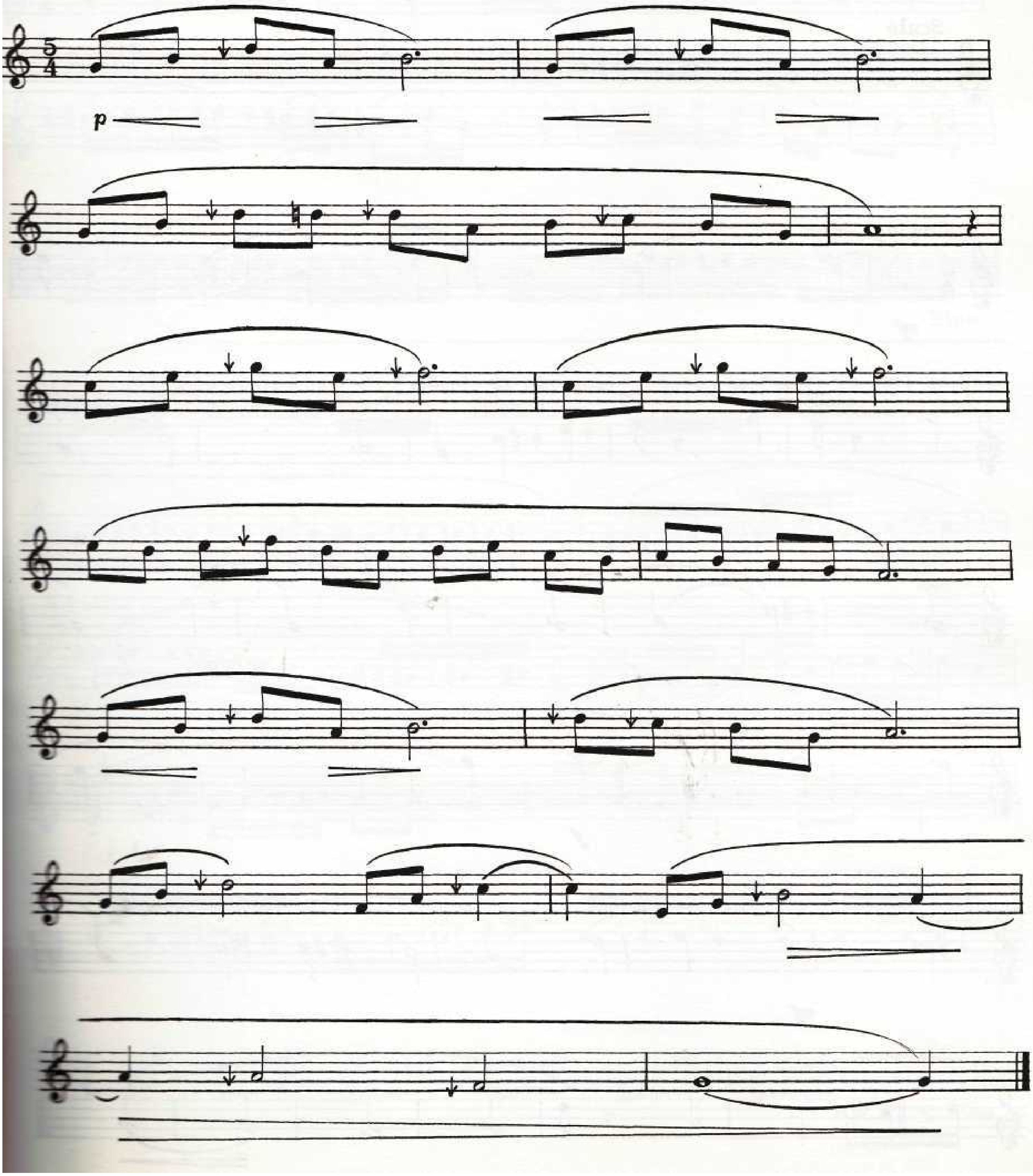


Medium



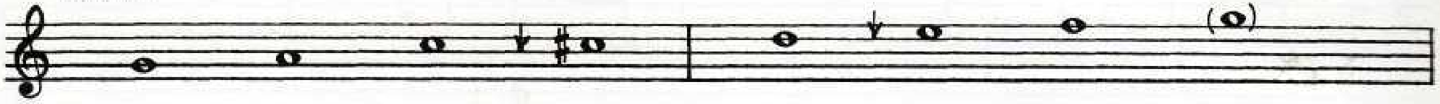
STUDY 3

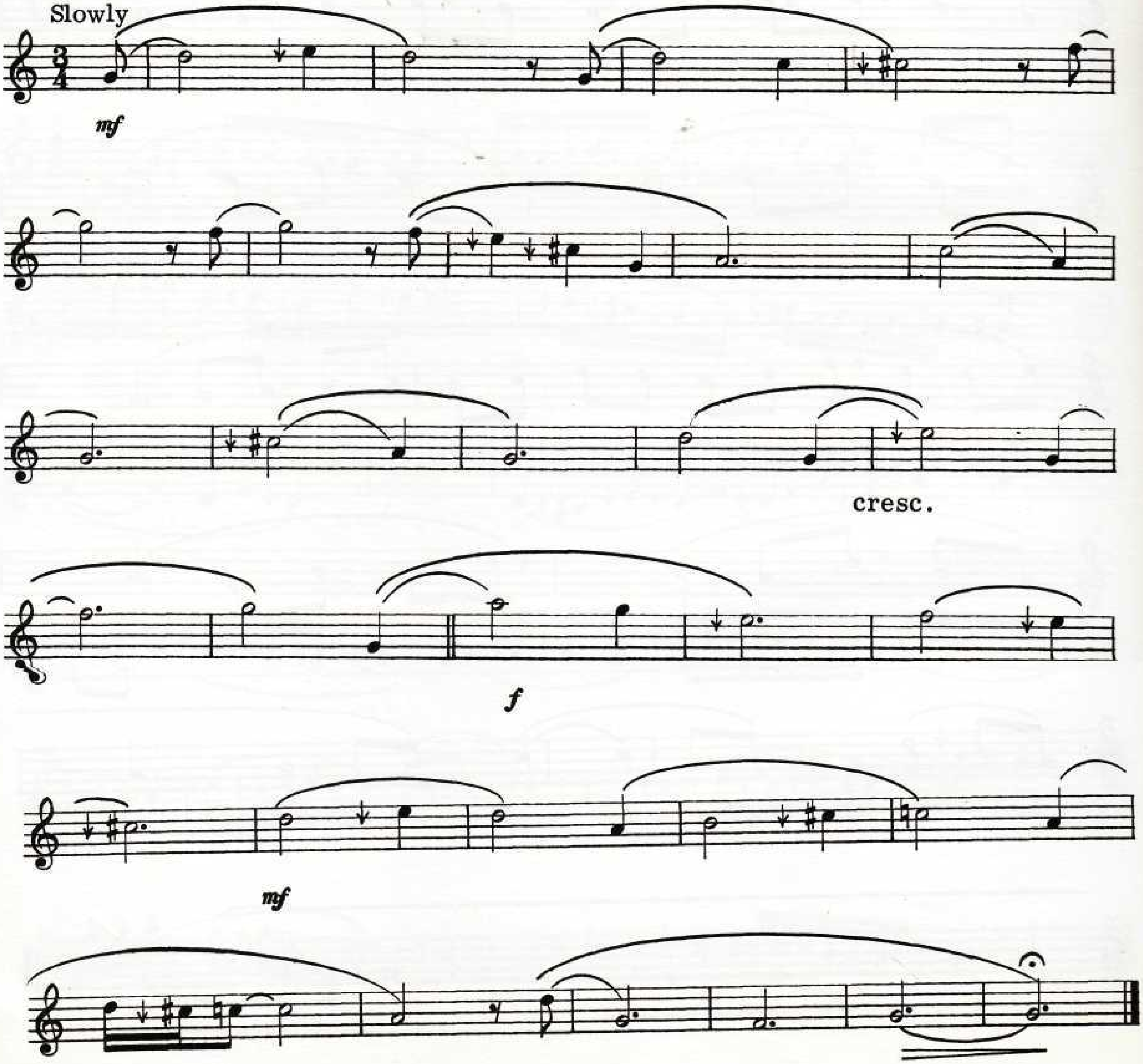
Medium - Legato



STUDY 4

Scale

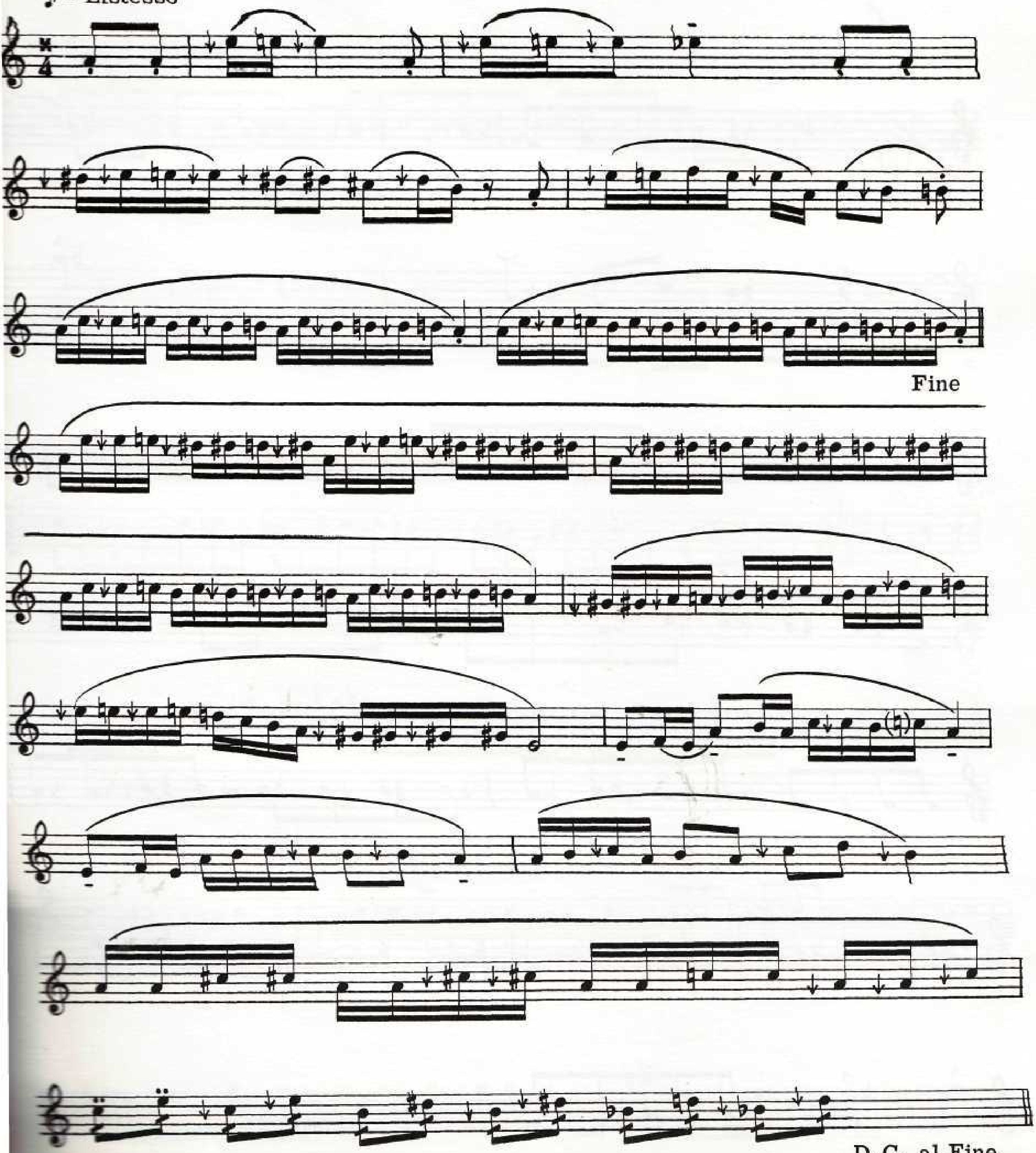




STUDY 5

Medium - without a sense of bar lines.

♪ = Listesso



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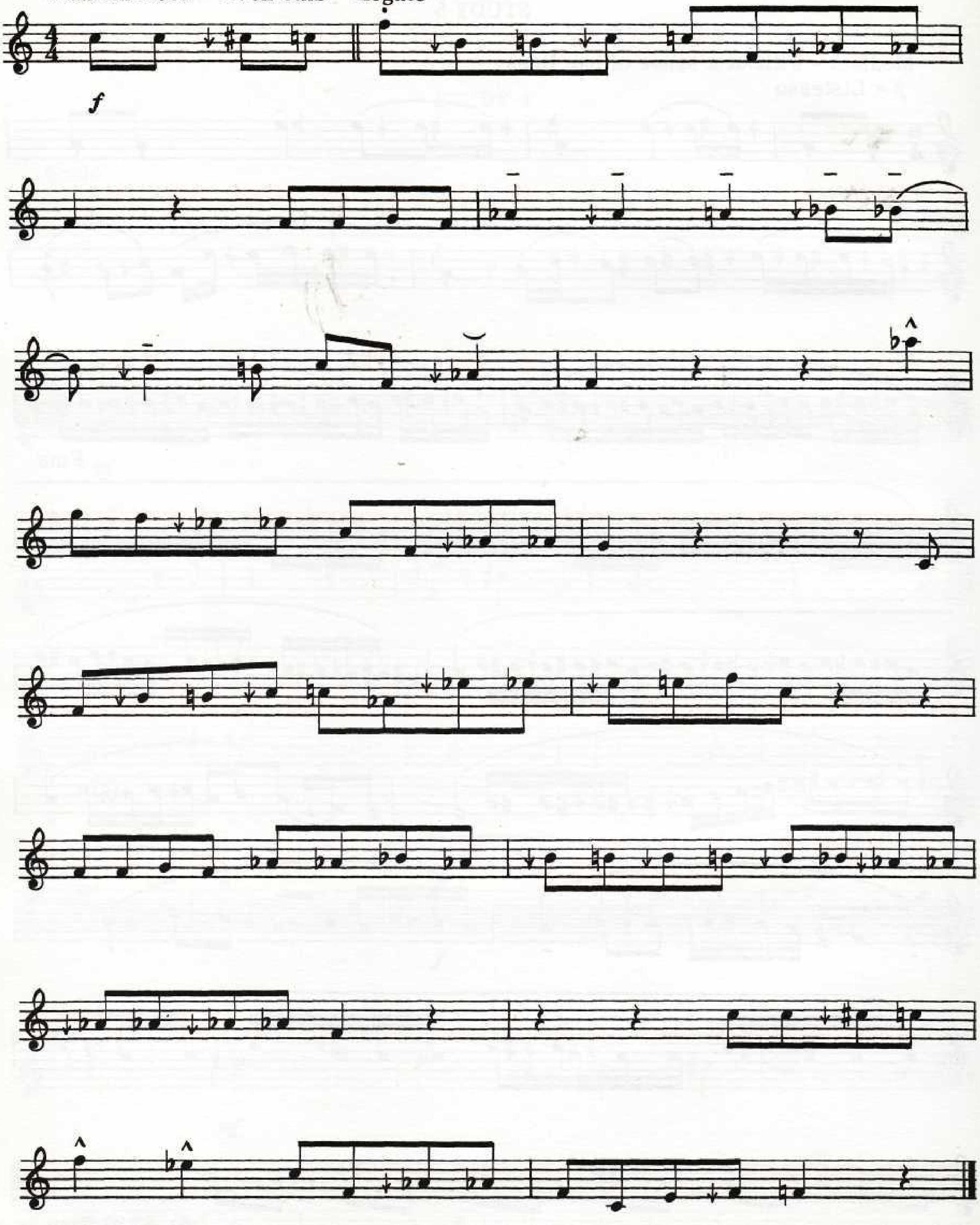
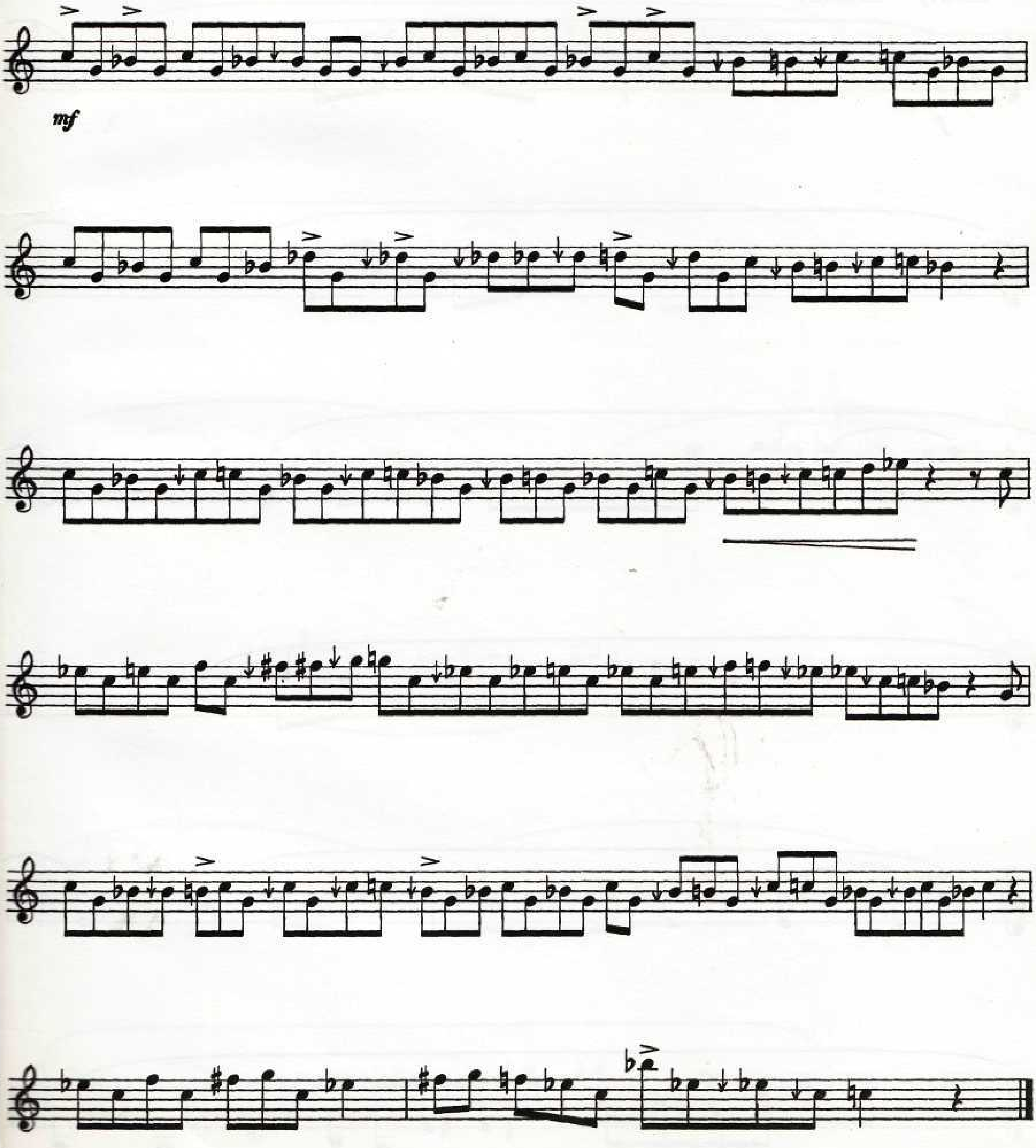
STUDY 6

Medium Rock - Even 8ths - Legato



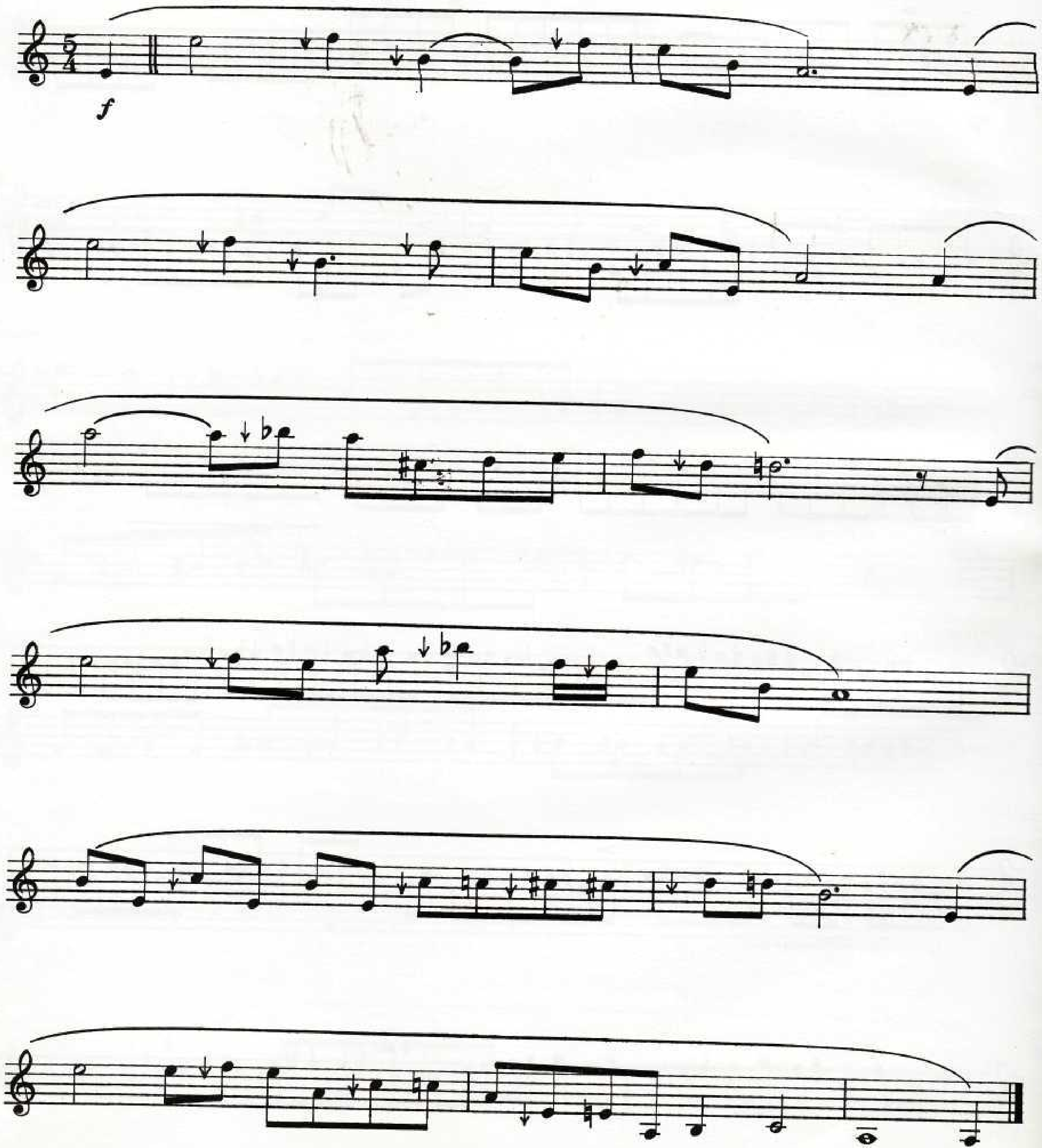
STUDY 7 (8th Notes)

Medium Fast - Staccato

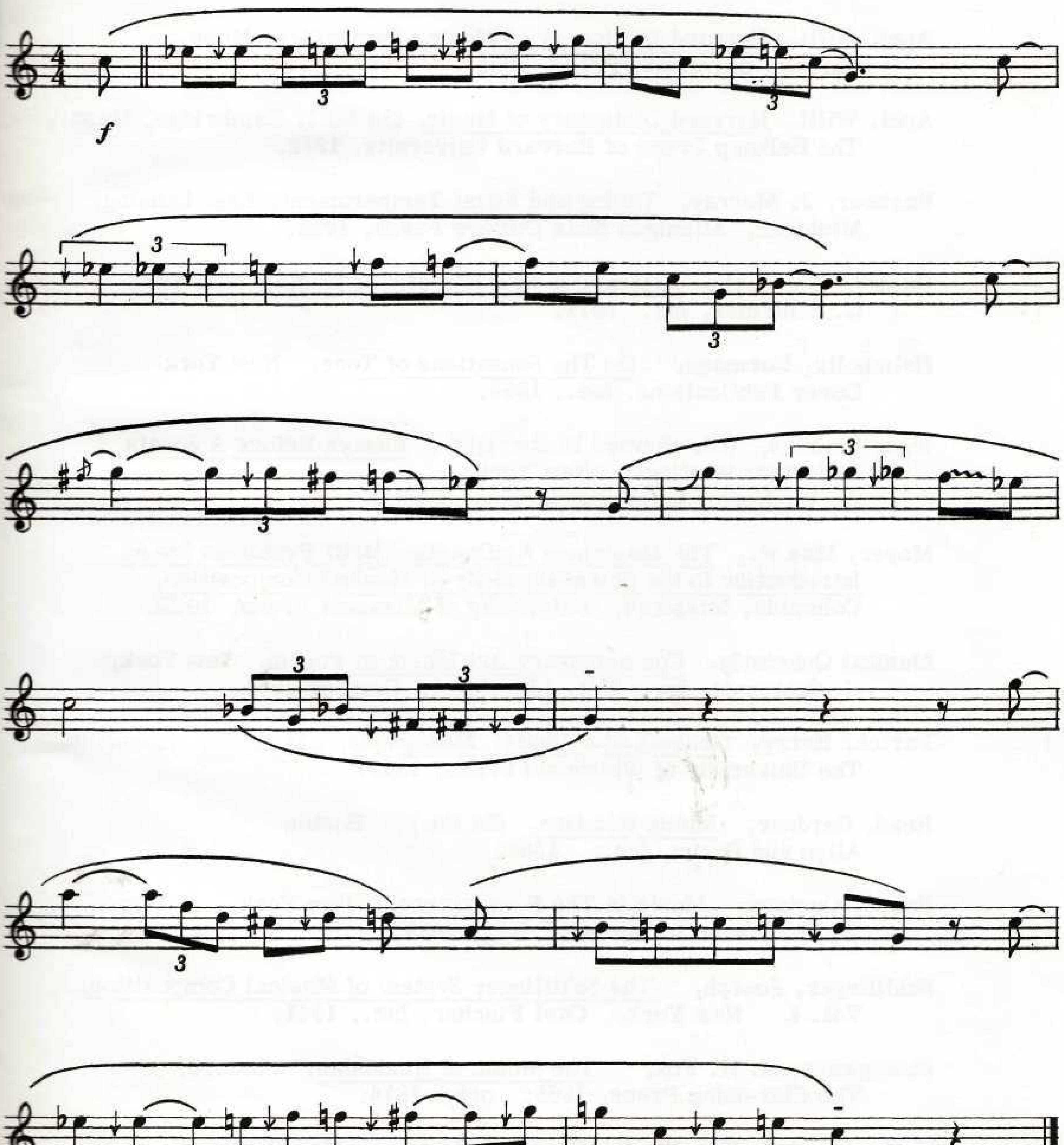


STUDY 8

Slowly - Broadly



STUDY 9 - THE BLUES



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